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MEDICAL INQUIRIES

AND

OBSERVATIONS.



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M E D I C A L
I N Q U I R I E S
A N D
O B S E R V A T I O N S.

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CLINICAL PRACTICE IN THE UNIVERSITY
OF PENNSYLVANIA.

VOLUME I.

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1794



To

JOHN REDMAN, M. D.

President of the College of Physicians of Philadelphia,

THIS SECOND AMERICAN EDITION

of a SMALL VOLUME of

MEDICAL INQUIRIES & OBSERVATIONS,

is inscribed,

As a Mark of Respect for the Virtues and Talents,
which adorn his venerable Age,

By his affectionate

and grateful

former pupil,

BENJAMIN RUSH.

14th June, 1794.

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AN
INQUIRY
INTO THE
NATURAL HISTORY OF MEDICINE AMONG THE
INDIANS OF NORTH-AMERICA.
AND A
COMPARATIVE VIEW
OF THEIR
DISEASES AND REMEDIES WITH THOSE OF
CIVILIZED NATIONS.

Read before the AMERICAN PHILOSOPHICAL SOCIETY,
held at PHILADELPHIA, on the 4th of February, 1774.

GENTLEMEN*,

I RISE with peculiar diffidence to address you upon this occasion, when I reflect upon the entertainment you proposed to yourselves from the eloquence of that learned member, Mr CHARLES THOMPSON, whom your suffrages appointed to this honor after the delivery of the last anniver-

* This INQUIRY was the subject of an Anniversary Oration. The style of an oration is therefore preserved in many parts of it.

VOL. I.

B

fary

fary oration. Unhappily for the interests of literature, his want of health has not permitted him to comply with your appointment. I beg therefore that you would forget, for a while, the abilities necessary to execute this task with propriety, and listen with candor to the efforts of a member, whose attachment to the society was the only qualification that entitled him to the honor of your choice.

The subject I have chosen for this evening's entertainment, is "An inquiry into the natural history of medicine among the Indians in North America, and a comparative view of their diseases and remedies, with those of civilized nations." You will readily anticipate the difficulty of doing justice to this subject. How shall we distinguish between the original diseases of the Indians and those contracted from their intercourse with the Europeans? By what arts shall we persuade them to discover their remedies? And lastly, how shall we come at the knowledge of facts in that cloud of errors, in which the credulity of the Europeans, and the superstition of the Indians have involved both their diseases and remedies? These difficulties serve to increase the importance of our subject. If I should not be
able

able to solve them, perhaps I may lead the way to more successful endeavours for that purpose.

I shall first limit the tribes of Indians who are to be the objects of this inquiry, to those who inhabit that part of North-America which extends from the 30th to the 60th degree of latitude. When we exclude the Esquimaux, who inhabit the shores of Hudson's bay, we shall find a general resemblance in the colour, manners and state of society, among all the tribes of Indians who inhabit the extensive tract of country above-mentioned.

Civilians have divided nations into savage, barbarous, and civilized. The savage, live by fishing and hunting. The barbarous, by pasturage or cattle; and the civilized by agriculture. Each of these is connected together in such a manner, that the whole appear to form different parts of a circle. Even the manners of the most civilized nations partake of those of the savage. It would seem as if liberty and indolence were the highest pursuits of man; and these are enjoyed in their greatest perfection by savages, or in the practice of customs which resemble those of savages.

The Indians of North-America partake chiefly of the manner of savages. In the earliest accounts we have of them, we find them cultivating a spot of ground. The maize is an original grain among them. The different dishes of it which are in use among the white people still retain Indian names.

It will be unnecessary to shew that the Indians live in a state of society adapted to all the exigencies of their mode of life. Those who look for the simplicity and perfection of the state of nature, must seek it in systems, as absurd in philosophy, as they are delightful in poetry.

Before we attempt to ascertain the number or history of the diseases of the Indians, it will be necessary to inquire into those customs among them which we know influence diseases. For this purpose I shall,

First, mention a few facts which relate to the birth and treatment of their children.

Secondly, I shall speak of their diet.

Thirdly, Of the customs which are peculiar to the sexes, And,

Fourthly,

Fourthly, Of those customs which are common to them both*.

I. Of the birth and treatment of their children.

Much of the future health of the body depends upon its original stamina. A child born of healthy parents always brings into the world a system formed by nature to resist the causes of diseases. The treatment of children among the Indians, tends to secure this hereditary firmness of constitution. Their first food is their mother's milk. To harden them against the action of heat and cold (the natural enemies of health and life among the Indians) they are plunged every day in cold water. In order to facilitate their being moved from place to place, and at the same time to pre-

* Many of the facts contained in the Natural History of Medicine among the Indians in this Inquiry, are taken from La Hontan and Charlevoix's histories of Canada; but the most material of them are taken from persons who had lived, or travelled among the Indians. The author acknowledges himself indebted in a particular manner to Mr Edward Hand, surgeon in the 18th regiment, afterwards brigadier-general in the army of the United States, who, during several years' residence at Fort Pitt, directed his inquiries into their customs, diseases, and remedies, with a success that does equal honour to his ingenuity and diligence.

serve their shape they are tied to a board, where they lie on their backs for six, ten, or eighteen months. A child generally sucks its mother till it is two years old, and sometimes longer. It is easy to conceive how much vigour their bodies must acquire from this simple, but wholesome nourishment. The appetite we sometimes observe in children for flesh is altogether artificial. The peculiar irritability of the system in infancy, forbids stimulating aliment of all kinds. Nature never calls for animal food till she has provided the child with those teeth which are necessary to divide it. I shall not undertake to determine how far the wholesome quality of the mother's milk is increased by her refusing the embraces of her husband, during the time of giving suck.

II. The diet of the Indians is of a mixed nature, being partly animal and partly vegetable; their animals are wild, and therefore easy of digestion. As the Indians are naturally more disposed to the indolent employment of fishing than hunting in summer, so we find them living more upon fish than land animals, in that season of the year.-- Their vegetables consist of roots and fruits, mild in themselves or capable of being made so by the action of fire. Although the interior parts of our continent abound with salt springs, yet I cannot
find

find that the Indians used salt in their diet, till they were instructed to do so by the Europeans. The small quantity of fixed alkali contained in the ashes on which they roasted their meat, could not add much to its stimulating quality. They preserve their meat from putrefaction, by cutting it into small pieces, and exposing it in summer to the sun, and in winter to the frost. In the one case its moisture is dissipated, and in the other so frozen, that it cannot undergo the putrefactive process. In dressing their meat, they are careful to preserve its juices. They generally prefer it in the form of soups. Hence we find, that among them the use of the spoon preceded that of the knife and fork. They take the same pains to preserve the juice of their meat when they roast it, by turning it often. The efficacy of this animal juice in dissolving meat in the stomach, has not been equalled by any of those sauces or liquors which modern luxury has mixed with it for that purpose.

The Indians have no set time for eating, but obey the gentle appetites of nature as often as they are called by them. After whole days spent in the chase or in war, they often commit those excesses in eating, to which long abstinence cannot fail of prompting them. It is common to see them spend three or four hours in satisfying their

hunger. This is occasioned not more by the quantity they eat, than by the pains they take in masticating it. They carefully avoid drinking water in their marches, from an opinion that it lessens their ability to bear fatigue.

III. We now come to speak of those customs which are peculiar to the sexes. And, first, of those which belong to the WOMEN. They are doomed by their husbands to such domestic labour as gives a firmness to their bodies, bordering upon the masculine. Their menses seldom begin to flow before they are eighteen or twenty years of age, and generally cease before they are forty. They have them in small quantities, but at regular intervals. They seldom marry till they are about twenty. The constitution has now acquired a vigour, which enables it the better to support the convulsions of child-bearing. This custom likewise guards against a premature old age. Doctor Bancroft ascribes the haggard looks—the loose hanging breasts—and the prominent bellies of the Indian women at Guiana, entirely to their bearing children too early*. Where marriages are unfruitful (which is seldom the case) a separation is obtained by means of an easy divorce; so that

* Natural History of Guiana.

they

they are unacquainted with the disquietudes which sometimes arise from barrenness. During pregnancy, the women are exempted from the more laborious parts of their duty : hence miscarriages rarely happen among them. Nature is their only midwife. Their labours are short, and accompanied with little pain. Each woman is delivered in a private cabin, without so much as one of her own sex to attend her. After washing herself in cold water, she returns in a few days to her usual employments; so that she knows nothing of those accidents which proceed from the carelessness or ill management of midwives; or those weaknesses which arise from a month's confinement in a warm room. It is remarkable that there is hardly a period in the interval between the eruption and the ceasing of the menses, in which they are not pregnant or giving suck. This is the most natural state of the constitution during that interval; and hence we often find it connected with the best state of health, in the women of civilized nations.

The customs peculiar to the Indian MEN, consist chiefly in those employments which are necessary to preserve animal life, and to defend their nation. These employments are hunting and war, each of which is conducted in a manner that tends

to call forth every fibre into exercise, and to ensure them the possession of the utmost possible health. In times of plenty and peace, we see them sometimes rising from their beloved indolence, and shaking off its influence by the salutary exercises of dancing and swimming. The Indian men seldom marry before they are thirty years of age: They no doubt derive considerable vigour from this custom; for while they are secured by it from the enervating effects of the premature dalliance of love, they may ensure more certain fruitfulness to their wives, and entail more certain health upon their children. Tacitus describes the same custom among the Germans, and attributes to it the same good effects. “Sera juvenum venus, eoque in-
 “exhausta pubertas; nec virgines festinantur;
 “eadem juvenata, similis proceritas, pares vali-
 “dique miscentur; ac robora parentum liberi
 “referunt*.

Among the Indian men, it is deemed a mark of heroism to bear the most exquisite pain without

* Cæsar, in his history of the Gallic war, gives the same account of the ancient Germans. His words are “Qui
 “diutissimi impuberes permanserunt, maximam inter suos
 “ferunt laudem: hoc ali staturam, ali vires, nervasque con-
 “firmari putant.” Lib. vi. xxi.

complain-

complaining ; upon this account they early inure themselves to burning part of their bodies with fire, or cutting them with sharp instruments. No young man can be admitted to the honours of manhood or war, who has not acquitted himself well in these trials of patience and fortitude. It is easy to conceive how much this contributes to give a tone to the nervous system, which renders it less subject to the occasional causes of diseases.

IV. We come now to speak of those customs which are common to both sexes : These are PAINTING, and the use of the COLD BATH. The practice of anointing the body with oil is common to the savages of all countries ; in warm climates it is said to promote longevity, by checking excessive perspiration. The Indians generally use bear's grease mixed with a clay, which bears the greatest resemblance to the colour of their skins. This pigment serves to lessen the sensibility of the extremities of the nerves ; it moreover fortifies them against the action of those exhalations, which we shall mention hereafter, as a considerable source of their diseases. The COLD BATH likewise fortifies the body, and renders it less subject to those diseases which arise from the extremes and vicissitudes of heat and cold. We shall speak hereafter of the Indian manner of using it.

It

It is a practice among the Indians never to drink before dinner, when they work or travel. Experience teaches, that filling the stomach with cold water in the forenoon, weakens the appetite, and makes the system more sensible of heat and fatigue.

The state of society among the Indians excludes the influence of most of those passions which disorder the body. The turbulent effects of anger are concealed in deep and lasting resentments. Envy and ambition are excluded by their equality of power and property. Nor is it necessary that the perfections of the whole sex should be ascribed to one, to induce them to marry. “The weakness of love (says Dr Adam Smith) which is so much indulged in ages of humanity and politeness, is regarded among savages as the most unpardonable effeminacy. A young man would think himself disgraced for ever, if he shewed the least preference of one woman above another, or did not express the most complete indifference, both about the time when, and the person to whom, he was to be married*.” Thus are they exempted from those violent or lasting diseases, which accompany the several

* Theory of Moral Sentiments.

stages of such passions in both sexes among civilized nations.

It is remarkable that there are no deformed Indians. Some have suspected from this circumstance, that they put their deformed children to death; but nature here acts the part of an unnatural mother. The severity of the Indian manners destroy them *.

From a review of the customs of the Indians, we need not be surpris'd at the stateliness, regularity of features, and dignity of aspect by which they are characteris'd. Where we observe these among ourselves, there is always a presumption of their being accompanied with health, and a strong constitution. The circulation of the blood is more languid in the Indians than in persons who are in the constant exercise of the habits of civilised life. Out of eight Indian men whose pulses I once examined at the wrists, I did not meet with one in whom the artery beat more than sixty-four strokes in a minute.

* Since the intercourse of the white people with the Indians, we find some of them deformed in their limbs. This deformity, upon inquiry, appears to be produced by those accidents, quarrels, &c. which have been introduced among them by spirituous liquors.

The

The marks of old age appear more early among Indian, than among civilized nations.

Having finished our inquiry into the physical customs of the Indians, we shall now proceed to inquire into their diseases.

A celebrated professor of anatomy has asserted, that we could not tell by reasoning *à priori*, that the body was mortal, so intimately woven with its texture are the principles of life. Lord Bacon declares, that the only cause of death which is natural to man, is that from old age ; and complains of the imperfection of physic, in not being able to guard the principle of life, until the whole of the oil that feeds it is consumed. We cannot admit of this proposition of our noble philosopher. In the inventory of the grave in every country, we find more of the spoils of youth and manhood than of age. This must be attributed to moral as well as physical causes.

We need only recollect the custom among the Indians, of sleeping in the open air in a variable climate—the alternate action of heat and cold upon their bodies, to which the warmth of their cabins exposes them—their long marches—their excessive exercise—their intemperance in eating,

to

to which their long fasting, and their public feasts naturally prompt them; and, lastly, the vicinity of their habitations to the banks of rivers, in order to discover the empire of diseases among them in every stage of their lives. They have in vain attempted to elude the general laws of mortality, while their mode of life subjects them to these remote, but certain causes of diseases.

From what we know of the action of these potentia nocentes upon the human body, it will hardly be necessary to appeal to facts to determine that FEVERS constitute the only diseases among the Indians. These fevers are occasioned by the sensible and insensible qualities of the air. Those which are produced by cold, are of the inflammatory kind, such as pleurisies, peripneumonies, and rheumatisms. Those which are produced by the insensible qualities of the air, or by putrid exhalations, are intermitting, remitting, and inflammatory, according as the exhalations are combined with more or less heat or cold. The DYSENTERY (which is an Indian disease) comes under the class of fevers. It appears to be the febris introversa of Dr Sydenham.

The Indians are subject to ANIMAL and VEGETABLE POISONS. The effects of these upon the
body,

body, are in some degree analogous to the exhalations we have mentioned. When they do not bring on sudden death, they produce, according to their malignity, either an inflammatory or putrid fever.

The SMALL POX and the VENEREAL DISEASE were communicated to the Indians in North-America by the Europeans. Nor can I find that they were ever subject to the SCURVY. Whether this was obviated by their method of preserving their flesh, or by their mixing it at all times with vegetables, I shall not undertake to determine. Dr Maclurg ascribes to fresh meat an antiseptic quality *. The peculiar customs and manners of life among the Indians, seem to have exempted them from these, as well as all other diseases of the fluids. The leprosy, elephantiasis, scurvy, and venereal disease, appear to be different modifications of the same primary disorder. The same causes produce them in every age and country. They are diversified like plants by climate and nourishment. They all sprung originally from a moist atmosphere and unwholesome diet; hence we read of their prevailing so much in the middle centuries, when the principal parts of Europe

* Experiments on the Bile, and Reflections on the Biliary Secretion.

were overflowed with water, and the inhabitants lived entirely on fish, and a few unwholesome vegetables. The abolition of the feudal system in Europe, by introducing freedom, introduced at the same time agriculture ; which by multiplying the fruits of the earth, lessened the consumption of animal food, and thus put a stop to these disorders. The elephantiasis is almost unknown in Europe. The leprosy is confined chiefly to the low countries of Africa. The *plica polonica* once so common in Poland, is to be found only in books of medicine. The small pox is no longer a fatal disorder, when the body is prepared for its reception by a vegetable regimen. Even the plague itself is losing its sting. It is hardly dreaded at this time in Turkey ; and its very existence is preserved there by the doctrine of fatalism, which prevails among the inhabitants of that country. It may serve as a new and powerful motive against political slavery to observe, that it is connected with those diseases which most deform and debase the human body. It may likewise serve to enhance the blessings of liberty, to trace its effects, in eradicating such loathsome and destructive disorders *.

* Muratori, in his *Antiquities of Italy in the middle ages*, describes the greatest part of Europe as overflowed with water.

I have heard of two or three cases of the GOUT among the Indians, but it was only among those who had learned the use of rum from the white

The writings of the historians of those ages are full of the physical and political miseries which prevailed during those centuries. The whole of the diseases we have mentioned, raged at one time in all the countries of Europe. In the ninth century there were 19,000 hospitals for lepers only, in Christendom. Lewis VIII. king of France, in the year 1227, bequeathed legacies to 2000 leprous hospitals in his own kingdom. The same diet, and the same dampness of soil and air, produced the same effects in South-America. The venereal disease probably made its appearance at the same time in South America and Naples. *Precis de l'histoire physique des tems*, par M. Raymond. The leprosy and scurvy still prevail in the northern parts of Europe, where the manner of living, among the inhabitants, still bears some resemblance to that which prevailed in the middle centuries. Pontopiddan's natural history of Norway. Between the years 1006 and 1680, we read of the plague being epidemic fifty-two times throughout all Europe. The situation of Europe is well known during the fourteenth century : every country was in arms ; agriculture was neglected ; nourishment of all kinds was scanty and unwholesome ; no wonder, therefore, that we read of the plague being fourteen times epidemic in Europe during that period. In proportion as the nations of Europe have become civilized, and cultivated the earth, together with the arts of peace, this disorder has gradually mitigated. It prevailed only six times in the sixteenth, and five times in the seventeenth centuries. It made its last general appearance in the year 1680. It has occasionally visited several cities in Europe with-

in

people. A question naturally occurs here, and that is, why does not the gout appear more frequently among that class of people, who consume the greatest quantity of rum among ourselves? To this I answer, that the effects of this liquor upon those enfeebled people, are too sudden and violent, to admit of their being thrown upon the extremities; as we know them to be among the Indians. They appear only in visceral obstructions, and a complicated train of chronic diseases. Thus putrid miasmata are sometimes too strong to bring on a fever, but produce instant debility and death. The gout is seldom heard of in Russia, Denmark, or Poland. Is this occasioned by the vigour of constitution peculiar to the inhabitants of

in the last century, but has raged with much less violence than formerly. It is highly probable its very existence would be destroyed, could the inhabitants of Turkey (where it is at all times endemic) be prevailed upon to use the same precautions to prevent its spreading, which have been found successful in other parts of Europe. The British, and other foreigners, who reside at Constantinople, escape the plague more by avoiding all intercourse with persons, houses, clothes, &c. infected with the disorder, than by any peculiarities in their diet or manners. That the use of wine alone does not preserve them from the infection, we learn from the history of the Armenians, who drink large quantities of wine; and yet, from their belief in the doctrine of fatalism, perish in the same proportion as the Turks.

those northern countries? or is it caused by their excessive use of spirituous liquors, which produce the same chronic complaints among them, which we said were common among the lower class of people in this country? The similarity of their diseases makes the last of these suppositions the most probable. The effects of wine, like tyranny in a well formed government, are felt first in the extremities; while spirits, like a bold invader, seize at once upon the vitals of the constitution.

After much inquiry, I have not been able to find a single instance of MADNESS, MELANCHOLY, or FATUITY among the Indians; nor can I find any accounts of *diseases* from WORMS among them. Worms are common to most animals; they produce diseases only in weak, or increase them in strong constitutions*. Hence they have no place in the nosological systems of physic. Nor does DENTITION appear to be a disorder among the Indians. The facility with which the healthy

* Indian children are not exempted from worms. It is common with the Indians, when a fever in their children is ascribed by the white people to worms, (from their being discharged occasionally in their stools) to say, "the fever makes the worms come, and not the worms the fever."

children of healthy parents cut their teeth among civilized nations, gives us reason to conclude that the Indian children never suffer from this quarter.

The Indians appear moreover to be strangers to diseases and pains in the teeth.

The employments of the Indians subject them to many accidents; hence we sometimes read of WOUNDS, FRACTURES, and LUXATIONS among them.

Having thus pointed out the natural diseases of the Indians, and shewn what disorders are foreign to them, we may venture to conclude, that FEVERS, OLD AGE, CASUALITIES and WAR, are the only natural outlets of human life. War is nothing but a distemper; it is founded in the imperfection of political bodies, just as fevers are founded on the weakness of the animal body.—Providence in these diseases seems to act like a mild legislature which mitigates the severity of death, by inflicting it in a manner the least painful upon the whole to the patient and the survivors.

Let us now inquire into the REMEDIES of the Indians. These, like their diseases, are simple,

and few in number. Among the first of them we shall mention the POWERS OF NATURE. Fevers, we said formerly, constituted the chief of the diseases among the Indians; they are likewise, in the hands of nature, the principal instruments to remove the evils which threaten her dissolution; but the event of these efforts of nature, no doubt, soon convinced the Indians of the danger of trusting her in all cases; and hence in the earliest accounts we have of their manners, we read of persons who were intrusted with the office of physicians.

It will be difficult to find out the exact order in which the Indian remedies were suggested by nature or discovered by art; nor will it be easy to arrange them in proper order. I shall however attempt it, by reducing them to NATURAL and ARTIFICIAL.

To the class of NATURAL REMEDIES belongs the Indian practice of abstracting from their patients all kinds of stimulating aliment. The compliance of the Indians with the dictates of nature, in the early stage of a disorder, no doubt, prevents in many cases their being obliged to use any other remedy. They follow nature still closer, in
allowing

allowing their patients to drink plentifully of cold water; this being the only liquor a patient calls for in the fever.

Sweating is likewise a natural remedy. It was probably suggested by observing fevers to be terminated by it. I shall not inquire how far these sweats are essential to the crisis of a fever. The Indian mode of procuring this evacuation is as follows: the patient is confined in a close tent, or wigwam, over a hole in the earth, in which a red hot stone is placed; a quantity of water is thrown upon this stone, which instantly involves the patient in a cloud of vapour and sweat; in this situation he rushes out, and plunges himself into a river; from whence he retires to his bed. If the remedy has been used with success, he rises from his bed in four and twenty hours, perfectly recovered from his indisposition. This remedy is used not only to cure fevers, but remove that uneasiness which arises from fatigue of body.

A third natural remedy among the Indians, is PURGING. The fruits of the earth, the flesh of birds, and other animals feeding upon particular vegetables, and above all the spontaneous efforts of nature, early led the Indians to perceive the necessity and advantages of this evacuation.

VOMITS constitute their fourth natural remedy. They were probably, like the former, suggested by nature, and accident. The ipecacuanha is one of the many roots they employ for this purpose.

The ARTIFICIAL REMEDIES made use of by the Indians, are BLEEDING, CAUSTICS, and ASTRINGENT medicines. They confine bleeding entirely to the part affected. To know that opening a vein in the arm, or foot, would relieve a pain in the head or side, supposes some knowledge of the animal economy, and therefore marks an advanced period in the history of medicine.

Sharp stones and thorns are the instruments they use to procure a discharge of blood.

We have an account of the Indians using something like a POTENTIAL CAUSTIC, in obstinate pains. It consists of a piece of rotten wood called *punk*, which they place upon the part affected, and afterwards set it on fire; the fire gradually consumes the wood, and its ashes burn a hole in the flesh.

The undue efforts of nature, in those fevers which are connected with a diarrhœa, or dysentery,

tery, together with those hemorrhagies to which their mode of life exposed them, necessarily led them to an early discovery of some ASTRINGENT VEGETABLES. I am uncertain whether the Indians rely upon astringent, or any other vegetables, for the cure of the intermitting fever. This disease among them probably requires no other remedies than the cold bath, or cold air. Its greater obstinacy, as well as frequency among ourselves, must be sought for in the greater feebleness of our constitutions; and in that change which our country has undergone, from meadows, mill-dams and the cutting down of woods; whereby morbid exhalations have been multiplied, and their passage rendered more free, through every part of country.

This is a short account of the remedies of the Indians. If they are simple, they are, like their eloquence, full of strength; if they are few in number, they are accommodated, as their languages are to their ideas, to the whole of their diseases.

We said, formerly, that the Indians were subject to ACCIDENTS, such as wounds, fractures, and the like. In these cases, nature performs the office

fice of a surgeon. We may judge of her qualifications for this office, by observing the marks of wounds and fractures, which are sometimes discovered on wild animals. But further, what is the practice of our modern surgeons in these cases? Is it not to lay aside plasters and ointments, and trust the whole to nature? Those ulcers which require the assistance of mercury, bark, and a particular regimen are unknown to the Indians.

The HEMORRAGES which sometimes follow their wounds, are restrained by plunging themselves into cold water, and thereby producing a constriction upon the bleeding vessels.

Their practice of attempting to recover DROWNED PEOPLE, is irrational and unsuccessful. It consists in suspending the patient by the heels, in order that the water may flow from his mouth. This practice is founded on a belief that the patient dies from swallowing an excessive quantity of water. But modern observation teaches us that drowned people die from another cause. This discovery has suggested a method of cure, directly opposite to that in use among the Indians; and has shewn us that the practice of suspending by the heels is hurtful.

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I do not find that the Indians ever suffer in their limbs from the action of COLD upon them. Their mokafons*, by allowing their feet to move freely, and thereby promoting the circulation of the blood, defend their lower extremities in the day-time, and their practice of sleeping with their feet near a fire, defends them from the morbid effects of cold at night. In those cases where the motion of their feet in their mokafons is not sufficient to keep them warm, they break the ice, and restore their warmth by exposing them for a short time to the stimulus of cold water†.

We have heard much of their specific antidotes to the VENEREAL DISEASE. In the accounts of these antivenereal medicines, some abatement should be made for that love of the marvellous, and of novelty, which are apt to creep into the writings of travellers and physicians. How many medicines which were once thought infallible in this disorder, are now rejected from the materia medica! I have found upon enquiry that the In-

* Indian shoes.

† It was remarked in Canada, in the winter of the year 1759, during the war before last, that none of those soldiers who wore mokafons were frost-bitten, while few of those escaped that were much exposed to the cold who wore shoes.

dians always assist their medicines in this disease, by a regimen which promotes perspiration. Should we allow that mercury acts as a specific in destroying this disorder, it does not follow that it is proof against the efficacy of medicines which act more mechanically upon the body *.

There cannot be a stronger mark of the imperfect state of knowledge in medicine among the Indians, than their method of treating the SMALL-POX. We are told that they plunge themselves in cold water in the beginning of the disorder, and that it generally proves fatal to them.

Travellers speak in high terms of the Indian ANTIDOTES TO POISONS. We must remember, that many things have been thought poisonous, which later experience hath proved to possess no unwholesome quality. Moreover, the uncertainty and variety in the operation of poisons, renders it extremely difficult to fix the certainty of the anti-

* I cannot help suspecting the antivenereal qualities of the lobelia, ceanothus and ranunculus, spoken of by Mr Kalm, in the memoirs of the Swedish academy. Mr Hand informed me, that the Indians rely chiefly upon a plentiful use of the decoctions of the pine-trees, against the venereal disease. He added moreover, that he had often known this disease prove fatal to them.

dotes to them. How many specifics have derived their credit for preventing the hydrophobia, from persons being wounded by animals, who were not in a situation to produce that disorder! If we may judge of all the Indian antidotes to poisons, by those which have fallen into our hands, we have little reason to ascribe much to them in any cases whatever.

I have heard of their performing several remarkable cures upon STIFF JOINTS, by an infusion of certain herbs in water. The mixture of several herbs together in this infusion calls in question the specific efficacy of each of them. I cannot help attributing the whole success of this remedy to the great heat of the water in which the herbs were boiled, and to its being applied for a long time to the part affected. We find the same medicine to vary frequently in its success, according to its strength, or to the continuance of its application. De Haen attributes the good effects of electricity, entirely to its being used for several months.

I have met with one case upon record of their aiding nature in PARTURITION. Captain Carver gives us an account of an Indian woman in a difficult labour, being suddenly delivered in consequence of a general convulsion induced upon her system,

system, by stopping, for a short time, her mouth and nose, so as to obstruct her breathing.

We are sometimes amused with accounts of Indian remedies for the DROPSY, EPILEPSY, COLIC, GRAVEL and GOUT. If, with all the advantages which modern physicians derive from their knowledge in ANATOMY, CHEMISTRY, BOTANY and PHILOSOPHY; if, with the benefit of discoveries communicated from abroad, as well as handed down from our ancestors, by more certain methods than tradition, we are still ignorant of certain remedies for these diseases; what can we expect from the Indians, who are not only deprived of these advantages, but want our chief motive, the sense of the pain and danger of those disorders to prompt them to seek for such remedies to relieve them? There cannot be a stronger proof of their ignorance of proper remedies for new or difficult diseases, than their having recourse to enchantment. But to be more particular; I have taken pains to inquire into the success of some of these Indian specifics, and have never heard of one well attested case of their efficacy. I believe they derive all their credit from our being ignorant of their composition. The influence of secrecy is well known in establishing the credit of a medicine. The *sal seignette* was an infallible medicine

medicine for the intermitting fever, while the manufactory of it was confined to an apothecary at Rochelle; but it lost its virtues as soon as it was found to be composed of the acid of tartar and the fossil alkali. Dr Ward's famous pill and drop ceased to do wonders in scrophulous cases as soon as he bequeathed to the world his receipts for making them.

I foresee an objection to what has been said concerning the remedies of the Indians, drawn from that knowledge which experience gives to a mind intent upon one subject. We have heard much of the perfection of their senses of seeing and hearing. An Indian, we are told, will discover not only a particular tribe of Indians by their footsteps, but the distance of time in which they were made. In those branches of knowledge which relate to hunting and war, the Indians have acquired a degree of perfection that has not been equalled by civilized nations. But we must remember, that medicine among them does not enjoy the like advantages with the arts of war and hunting, of being the *chief* object of their attention. The physician and the warrior are united in one character; to render him as able in the former as he is in the latter profession, would require
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an entire abstraction from every other employment, and a familiarity with external objects, which are incompatible with the wandering life of savages.

Thus have we finished our inquiry into the diseases and remedies of the Indians in North-America. We come now to inquire into the diseases and remedies of civilized nations.

Nations differ in their degrees of civilization. We shall select one for the subject of our enquiries which is most familiar to us ; I mean the British nation. Here we behold subordination and classes of mankind established by government, commerce, manufactures, and certain customs common to most of the civilized nations of Europe. We shall trace the origin of their diseases through their customs in the same manner as we did those of the Indians.

I. It will be sufficient to name the degrees of heat, the improper aliment, the tight dresses, and the premature studies children are exposed to, in order to shew the ample scope for diseases, which is added to the original defect of stamina they derive from their ancestors.

II.

II. Civilization rises in its demands upon the health of women. Their fashions; their dress and diet; their eager pursuits and ardent enjoyment of pleasure; their indolence and undue evacuations in pregnancy; their cordials, hot regimen and neglect or use of art, in child-birth, are all so many inlets to diseases.

Humanity would fain be silent, while philosophy calls upon us to mention the effects of interested marriages, and of disappointments in love, increased by that concealment which the tyranny of custom has imposed upon the sex*. Each of these exaggerates the natural, and increases the number of artificial diseases among women.

III. The diseases introduced by civilization extend themselves through every class and profession

* “ Married women are more healthy and long-lived
 “ than single women. The registers, examined by Mr Mu-
 “ ret, confirm this observation; and show particularly, that
 “ of equal numbers of single and married women between
 “ fifteen and twenty-five years of age, more of the former
 “ died than of the latter, in the proportion of two to one :
 “ the consequence, therefore, of following nature must be
 “ favourable to health among the female sex.” Supplement
 to Price’s Observations on Reversionary Payments.
 p. 357.

among men. How fatal are the effects of idleness and intemperance among the rich, and of hard labour and penury among the poor! What pallid looks are contracted by the votaries of science from hanging over the “sickly taper!” How many diseases are entailed upon manufacturers, by the materials in which they work, and the posture of their bodies! What monkish diseases do we observe from monkish continence and monkish vices! We pass over the increase of accidents from building, sailing, riding, and the like. War, as if too slow in destroying the human species, calls in a train of diseases peculiar to civilized nations. What havock have the corruption and monopoly of provisions, a damp soil, and an unwholesome sky, made, in a few days, in an army! The achievements of British valour at the Havannah, in the last war, were obtained at the expence of 9,000 men, 7,000 of whom perished with the West India fever*. Even our modern

* The modern writers upon the diseases of armies, wonder that the Greek and Roman physicians have left us nothing upon that subject. But may not *most* of the diseases of armies be produced by the different manner in which wars are carried on by the modern nations? The discoveries in geography, by extending the field of war, expose soldiers to many diseases from long voyages, and a *sudden* change of climate; which were unknown to the
armies

discoveries in geography, by extending the empire of commerce, have likewise extended the empire of diseases. What desolation have the East and West Indies made of British subjects! It has been found upon a nice calculation, that only ten of an hundred Europeans, live above seven years after they arrive in the island of Jamaica.

IV. It would take up too much of our time to point out all the customs both *physical* and *moral*, which influence diseases among both sexes. The former have engendered the seeds of diseases in the human body itself: hence the origin of catarrhs, jail and military fevers, with a long train of contagious disorders, which compose so great a part of our books of medicine. The latter likewise have a large share in producing diseases. I am not one of those modern philosophers, who derive the vices of mankind from the influence of civilization; but I am safe in asserting, that their number and malignity increase with the refinements of polished life. To prove this, we need only survey a scene too familiar to affect us: it is

armies of former ages. Moreover, the form of the weapons, and the variety in the military exercises of the Grecian and Roman armies, gave a vigour to the constitution, which can never be acquired by the use of muskets and artillery.

a bedlam; which injustice, inhumanity, avarice, pride, vanity, and ambition, have filled with inhabitants.

Thus have we briefly pointed out the customs which influence the diseases of civilized nations. It remains now that we take notice of their diseases. Without naming the many new fevers, fluxes, hemorrhages, swellings from water, wind, flesh, fat, pus and blood; foulnesses on the skin from cancers, leprosy, yawes, poxes, and itch; and lastly, the gout, the hysteria, and the hypochondriasis, in all their variety of known and unknown shapes; I shall sum up all that is necessary upon this subject, by adding, that the number of diseases which belong to civilized nations, according to Doctor Cullen's nosology, amounts to 1387; the single class of nervous diseases form 612 of this number.

Before we proceed to speak of the remedies of civilized nations, we shall examine into the abilities of NATURE in curing their diseases. We found her active and successful in curing the diseases of the Indians. Is her strength, wisdom, or benignity, equal to the increase of those dangers which threaten her dissolution among civilized nations? In order to answer this question, it will be

be necessary to explain the meaning of the term nature.

By nature, in the present case, I understand nothing but *physical necessity*. This at once excludes every thing like intelligence from her operations: these are all performed in obedience to the same laws which govern vegetation in plants and the intestine motions of fossils. They are as truly mechanical as the laws of gravitation, electricity or magnetism. A ship when laid on her broadside by a wave, or a sudden blast of wind, rises by the simple laws of her mechanism; but suppose this ship to be attacked by fire, or a water-spout, we are not to call in question the skill of the ship-builder, if she be consumed by the one, or sunk by the other. In like manner, the Author of nature hath furnished the body with powers to preserve itself from its natural enemies; but when it is attacked by those civil foes which are bred by the peculiar customs of civilization, it resembles a company of Indians, armed with bows and arrows, against the complicated and deadly machinery of fire-arms. To place this subject in a proper light, we shall deliver a history of the operations of nature in a few of the diseases of civilized nations.

I. There are cases in which nature is still successful in curing diseases.

In fevers she still deprives us of our appetite for animal food, and imparts to us a desire for cool air and cold water.

In hemorrhages she produces a faintness, which occasions a coagulum in the open vessels; so that the further passage of blood through them is obstructed.

In wounds of the flesh and bones she discharges foreign matter by exciting an inflammation, and supplies the waste of both with new flesh and bone.

II. There are cases where the efforts of nature are too feeble to do service, as in putrid and nervous fevers.

III. There are cases where the efforts of nature are over proportioned to the strength of the disease, as in the cholera morbus and dysentery.

IV. There are cases where nature is idle, as in the atonic stages of the gout, the cancer, the epilepsy,

lepsy, the mania, the venereal disease, the apoplexy, and the tetanus*.

V. There are cases in which nature does mischief. She wastes herself with an unnecessary fever, in a dropsy and consumption. She throws a plethora upon the brain and lungs in the apoplexy and peripneumonia notha. She ends a pleurisy and peripneumony in a vomica, or empyema. She creates an unnatural appetite for food in the hypochondriac disorder. And lastly, she drives the melancholy patient to solitude, where, by brooding over the subject of his insanity, he increases his disease.

We are accustomed to hear of the salutary kindness of nature in alarming us with pain, to prompt us to seek for a remedy. But,

VI. There are cases in which she refuses to send this harbinger of the evils which threaten her, as in the aneurism, scirrhus, and stone in the bladder.

VII. There are cases where the pain is not proportioned to the danger, as in the tetanus, consumption, and dropsy of the head. And,

* Hoffman de hypothesium medicarum damno, sect. xv.

VIII. There are cases where the pain is over-proportioned to the danger, as in the paronychia and tooth-ach.

This is a short account of the operations of nature, in the diseases of civilized nations. A lunatic might as well plead against the sequestration of his estate, because he once enjoyed the full exercise of his reason, or because he still had lucid intervals, as nature be exempted from the charges we have brought against her.

But this subject will receive strength from considering the REMEDIES of civilized nations. All the products of the vegetable, fossil, and animal kingdoms, tortured by heat and mixture into an almost infinite variety of forms; bleeding, cupping, artificial drains by setons, issues, and blisters; exercise, active and passive; voyages and journies; baths, warm and cold; waters saline, aërial and mineral; food by weight and measure; the royal touch; enchantment; miracles; in a word, the combined discoveries of natural history and philosophy, united into a system of materia medica, all show, that although physicians are in speculation the servants, yet in practice they are the masters of nature. The whole of their remedies seem contrived on purpose to arouse, assist, restrain, and controul her operations.

There

There are some truths like certain liquors, which require strong heads to bear them. I feel myself protected from the prejudices of vulgar minds, when I reflect that I am delivering these sentiments in a society of philosophers.

Let us now take a COMPARATIVE VIEW of the diseases and remedies of the Indians with those of civilized nations. We shall begin with their diseases.

In our account of the diseases of the Indians we beheld death executing his commission, it is true; but then his dart was hid in a mantle, under which he concealed his shape. But among civilized nations we behold him multiplying his weapons in proportion to the number of organs and functions in the body; and pointing each of them in such a manner, as to render his messengers more terrible than himself.

We said formerly that fevers constituted the chief diseases of the Indians. According to Doctor Sydenham's computation, above 66,000 out of 100,000 died of fevers in London about 100 years ago; but fevers now constitute but a little more than one-tenth part of the diseases of that city. Out of 21,780 persons who died in London
between

between December 1770 and December 1771, only 2273 died of simple fevers. I have more than once heard Doctor Huck complain, that he could find no marks of epidemic fevers in London as described by Dr Sydenham. London has undergone a revolution in its manners and customs since Doctor Sydenham's time. New diseases, the offspring of luxury, have supplanted fevers; and the few that are left, are so complicated with other diseases that their connection can no longer be discovered with an epidemic constitution of the year. The pleurisy and peripneumony those inflammatory fevers of strong constitutions, are now lost in catarrhs, or colds; which instead of challenging the powers of nature or art to a fair combat, insensibly undermine the constitution, and bring on an incurable consumption. Out of 22,434 who died in London between December 1769, and the same month in 1770, 4594 perished with that *British* disorder. Our countryman, Doctor Maclurg, has ventured to foretel that the gout will be lost in a few years, in a train of hypocondriac, hysteric and bilious disorders. In like manner, may we not look for a season when fevers, the natural diseases of the human body, will be lost in an inundation of artificial diseases, brought on by the modish practices of civilization?

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It may not be improper to compare the prognosis of the Indians, in diseases, with that of civilized nations, before we take a comparative view of their remedies.

The Indians are said to be successful in predicting the events of diseases. While diseases are simple, the marks which distinguish them, or characterize their several stages, are generally uniform and obvious to the most indifferent observer. These marks afford so much certainty, that the Indians sometimes kill their physicians for a false prognosis, charging the death of the patient to their carelessness, or ignorance. They estimate the danger of their patients by the degrees of appetite; while an Indian is able to eat, he is looked upon as free from danger. But when we consider the number and variety in the signs of diseases, among civilized nations, together with the shortness of life, the fallacy of memory, and the uncertainty of observation, where shall we find a physician willing to risk his reputation, much less his life, upon the prediction of the event of our acute diseases? We can derive no advantage from the simple sign, by which the Indians estimate the danger of their patients; for we daily see a want of appetite for food in diseases which are attended with no danger; and we sometimes observe

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an unusual degree of this appetite to precede the agonies of death. I honour the name of HIPPOCRATES: But forgive me ye votaries of antiquity, if I attempt to pluck a few grey hairs from his venerable head. I was once an idolater at his altar, nor did I turn apostate from his worship, till I was taught, that not a tenth part of his prognostics corresponded with modern experience, or observation. The pulse *, urine, and sweats, from which the principle signs of life and death have been taken, are so variable in most of the acute diseases of civilized nations, that the wisest physicians have in some measure excluded the prognosis from being a part of their profession.

I am here insensibly led to make an apology for the instability of the theories and practice of physic. The theory of physic is founded upon the laws of the animal economy. These (unlike

* Doctor Cullen used to inform his pupils, that after forty years experience, he could find no relation between his own observations on the pulse, and those made by Doctor Solano. The climate and customs of the people in Spain being so different from the climate and customs of the present inhabitants of Britain, may account for the diversity of their observations. Doctor Heberden's remarks upon the pulse, in the second volume of the Medical Transactions, are calculated to show how little the issue of diseases can be learned from it.

the laws of the mind, or the common laws of matter) do not appear at once, but are gradually brought to light by the phænomena of diseases. The success of nature in curing the simple diseases of Saxony, laid the foundation for the ANIMA MEDICA of Doctor STAHL. The endemics of Holland * led Doctor BOERHAAVE to seek for the causes of all diseases in the FLUIDS. And the universal prevalence of the disease of the NERVES, in Great-Britain, led Doctor CULLEN to discover their peculiar laws, and to found a system upon them; a system, which will probably last till some new diseases are let loose upon the human species, which shall unfold other laws of the animal œconomy.

It is in consequence of this fluctuation in the principles and practice of physic, being so necessarily connected with the changes in the customs

* “The scurvy is very frequent in Holland; and draws its origin partly from their strong food, sea-fish, and smoked flesh, and partly from their dense and moist air, together with their bad water.” Hoffman on Endemical Distempers.

“We are now in North-Holland; and I have never seen, among so few people, so many infected with the leprosy as here. They say the reason is, because they eat so much fish.” Howell’s Familiar Letters.

of civilized nations, that old and young physicians so often disagree in their opinions and practices. And it is by attending to the constant changes in these customs of civilized nations, that those physicians have generally become the most eminent, who have soonest emancipated themselves from the tyranny of the schools of physic; and having occasionally accommodated their principles and practice to the changes in diseases *. This variety in diseases, which is produced by the changes in the customs of civilized nations, will enable us to account for many of the contradictions which are to be found in authors of equal candour and abilities, who have written upon the *materia medica*.

* We may learn from these observations, the great impropriety of those Egyptians laws which oblige physicians to adopt, in all cases, the prescriptions which had been collected, and approved of, by the physicians of former ages. Every change in the customs of civilized nations, produces a change in their diseases, which calls for a change in their remedies. What havoc would plentiful bleeding, purging, and small beer, formerly used with so much success by Dr Sydenham in the cure of fevers, now make upon the enfeebled citizens of London! The fevers of the same, and of more southern latitudes, still admit of such antiphlogistic remedies. In the room of these, bark, wine, and other cordial medicines, are prescribed in London in almost every kind of fever.

In forming a comparative view of the REMEDIES of the Indians, with those of civilized nations, we shall remark, that the want of success in a medicine is occasioned by one of the following causes.

First, our ignorance of the disorder. Secondly, an ignorance of a suitable remedy. Thirdly, a want of efficacy in the remedy.

Considering the violence of the diseases of the Indians, it is probable their want of success is always occasioned by a want of efficacy in their medicines. But the case is very different among the civilized nations. Dissections daily convince us of our ignorance of the seats of diseases, and cause us to blush at our prescriptions. What certain or equal remedies have we found for the gout, the epilepsy, apoplexy, palsy, dropsy of the brain, cancer and consumption? How often are we disappointed in our expectation from the most certain and powerful of our remedies, by the negligence or obstinacy of our patients! What mischief have we done under the belief of false facts (if I may be allowed the expression) and false theories! We have assisted in multiplying diseases.—We have done more—we have increased their mortality.

But

I shall not pause to beg pardon of the faculty, for acknowledging in this public manner the weaknesses of our profession. I am pursuing truth, and while I can keep my eye fixed upon my guide, I am indifferent whither I am led, provided she is my leader.

But further, the Indian submits to his disease, without one fearful emotion from his doubtfulness of its event; and at last meets his fate without an anxious wish for futurity; except it is of being admitted to an "equal sky," where

"His faithful dog shall bear him company."

But among civilized nations, the influence of a false religion in good, and of a true religion in bad men, has converted even the fear of death into a disease. It is this original distemper of the imagination which renders the plague most fatal, upon his first appearance in a country.

Under all these disadvantages in the state of medicine, among civilized nations, do more in proportion die of the diseases peculiar to them, than of fevers, casualties and old age, among the Indians? If we take our account from the city of London, we shall find this to be the case. Near a twentieth part of its inhabitants perish one year

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with another. Nor does the natural increase of inhabitants supply this yearly waste. If we judge from the bills of mortality, the city of London contains fewer inhabitants, by several thousands, than it did forty years ago. It appears from this fact, and many others of a like nature, which might be adduced, that although the difficulty of supporting children, together with some peculiar customs of the Indians, which we mentioned, limit their number, yet they multiply faster, and die in a smaller proportion than civilized nations, under the circumstances we have described. The Indians, we are told, were numerous in this country before the Europeans settled among them: Travellers agree likewise in describing numbers of both sexes who exhibited all the marks of extreme old age. It is remarkable that age seldom impairs the faculties of their minds.

The mortality peculiar to those Indian tribes who have mingled with the white people, must be ascribed to the extensive mischief of spirituous liquors. When these have not acted, they have suffered from having accommodated themselves too suddenly to the European diet, dress, and manners. It does not become us to pry too much into futurity; but if we may judge from the fate of the original natives of Hispaniola, Jamaica, and the

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provinces

provinces on the continent, we may venture to foretell, that, in proportion as the white people multiply, the Indians will diminish ; so that in a few centuries they will probably be entirely extirpated *.

It may be said, that health among the Indians, like insensibility to cold and hunger, is proportioned to their need of it ; and that the less degrees, or entire want of health, are no interruption to the ordinary business of civilized life.

To obviate this supposition, we shall first attend to the effects of a single distemper in those people who are the principle wheels in the machine of civil society. Justice has stopt its current, victories, have been lost, wars have been prolonged, and

* Even the influence of CHRISTIAN principles has not been able to put a stop to the mortality introduced among the Indians, by their intercourse with the Europeans. Dr Cotton Mather, in a letter to Sir William Ashurst, printed, in Boston in the year 1705, says “ That about five years before, there were about thirty Indian congregations in the southern parts of the province of Massachusetts-Bay.” The same author, in his history of New-England, says, “ That in the islands of Nantucket and Martha’s Vineyard, there were 3000 *adult* Indians, 1600 of whom professed the Christian religion.” At present there is but *one* Indian congregation in the whole Massachusetts province.

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embassies delayed, by the principle actors in these departments of government being suddenly laid up by a fit of the gout. How many offences are daily committed against the rules of good breeding, by the tedious histories of our disorders, which compose so great a part of modern conversation! What sums of money have been lavished in foreign countries in pursuit of health*! Families have been ruined by the unavoidable expences of medicines and watering-places. In a word, the swarms of beggars which infest so many of the European countries, urge their petitions for charity chiefly by arguments derived from real or counterfeit diseases, which render them incapable of supporting themselves†.

But may not civilization, while it abates the violence of natural diseases, increase the lenity of

It may serve to extend our knowledge of diseases, to remark, that epidemics were often observed to prevail among the Indians in Nantucket, without affecting the white people.

* It is said, there are seldom less than 20,000 British subjects in France and Italy; one half of whom reside or travel in those countries upon the account of their health.

† Templeman computes, that Scotland contains 1,500,000 inhabitants; 100,000 of whom, according to Mr Fletcher, are supported at the public expence. The proportion of poor people is much greater in England, Ireland, France, and Italy.

those that are artificial, in the same manner that it lessens the strength of natural vices by multiplying them? To answer this question, it will only be necessary to ask another: Who should exchange the heat, thirst and uneasiness of a fever, for one fit of the cholic or stone?

The history of the number, combination and fashions of the remedies we have given, may serve to humble the pride of philosophy; and to convince us that with all the advantages of the whole circle of sciences, we are still ignorant of antidotes to many of the diseases of civilized nations. We sometimes sooth our ignorance by reproaching our idleness in not investigating the remedies peculiar to this country. We are taught to believe that every herb that grows in our woods is possessed of some medicinal virtue, and that heaven would be wanting in benignity if our country did not produce remedies for all the different diseases of its inhabitants. It would be arrogating too much to suppose that man was the only creature in our world for whom vegetables grow. The beasts, birds and insects, derive their sustenance either directly or indirectly from them; while many of them were probably intended from their variety in figure, foliage and colour, only to serve as ornaments for our globe. It would seem strange that
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the Author of nature should furnish every spot of ground with medicines adapted to the diseases of its inhabitants, and at the same time deny it the more necessary articles of food and cloathing. I know not whether heaven has provided every country with antidotes even to the *natural* diseases of its inhabitants. The intermitting fever is common in almost every corner of the globe; but a sovereign remedy for it has been discovered only in South-America. The combination of bitter and astringent substances, which serve as a succedaneum to the Peruvian bark, is as much a preparation of art, as calomel or tartar emetic. Societies stand in need of each other as much as individuals: and the goodness of the Deity remains unimpeached when we suppose, that he intended medicines to serve (with other articles) to promote that knowledge, humanity, and politeness among the inhabitants of the earth, which have been so justly attributed to commerce.

We have no discoveries in the *materia medica* to hope for from the Indians in North-America. It would be a reproach to our schools of physic, if modern physicians were not more successful than the Indians, even in the treatment of their own diseases,

Do the blessings of civilization compensate for the sacrifice we make of natural health, as well as of natural liberty? This question must be answered under some limitations. When natural liberty is given up for laws which enslave instead of protecting us, we are immense losers by the exchange. Thus, if we arm the whole elements against our health, and render every pore in the body an avenue for a disease, we pay too high a price for the blessings of civilization.

In governments which have departed entirely from their simplicity, partial evils are to be cured by nothing but an entire renovation of their constitution. Let the world bear with the professions of law, physic, and divinity; and let the lawyer, physician and divine yet learn to bear with each other. They are all necessary, in the present state of society. In like manner, let the women of fashion forget the delicacy of her sex, and submit to be delivered by a man-midwife*. Let her snatch her offspring from her breast, and send it to repair

* In the enervated age of Athens, a law was passed which confined the practice of midwifery only to the men. It was, however, repealed, upon a woman's dying in childbirth, rather than be delivered by a man-midwife. It appears from the bills of mortality in London and Dublin, that about one in seventy of those women die in childbirth who are in the hands

the weakness of its stamina, with the milk of a ruddy cottager*. Let art supply the place of nature in the preparation and digestion of all our aliment. Let our fine ladies keep up their colour with carmine, and their spirits with ratifia; and let our fine gentlemen defend themselves from the excesses of heat and cold, with lavender and hartshorn. These customs have become necessary in the corrupt stages of society. We must imitate, in these

hands of midwives; but from the accounts of the lying-in hospitals in those cities which are under the care of man-midwives, only one in an hundred and forty perishes in childbirth.

* There has been much common-place declamation against the custom among the great, of not suckling their children. Nurses were common in Rome, in the declension of the empire: hence we find Cornelia commended as a rare example of maternal virtue, as much for suckling her sons, as for teaching them eloquence. That nurses were common in Egypt, is probable from the contract which Pharaoh's daughter made with the unknown mother of Moses, to allow her wages for suckling her own child. The same degrees of civilization require the same customs. A woman whose times for eating, sleeping, &c. are constantly interrupted by the calls of enervating pleasures, must always afford milk of an unwholesome nature. It may truly be said of a child doomed to live on this aliment, that as soon as it receives its

———"breath,
It sucks in "the lurking principles of death."

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cases,

cases, the practice of those physicians who consult the appetite only, in diseases which do not admit of a remedy.

The state of a country in point of population, temperance, and industry, is so connected with its diseases, that a tolerable idea may be formed of it, by looking over its bills of mortality. HOSPITALS, with all their boasted advantages, exhibit at the same time monuments of the charity and depravity of a people *. The opulence of physicians, and the divisions of their offices, into those of surgery,

* “Aurengezebe, emperor of Persia, being asked Why he did not build hospitals ? said, *I will make my empire so rich, that there shall be no need of hospitals.* He ought to have said, I will begin by rendering my subjects rich, and then I will build hospitals.

“At Rome, the hospitals place every one at his ease, except those who labour, those who are industrious, those who have lands, and those who are engaged in trade.

“I have observed, that wealthy nations have need of hospitals, because fortune subjects them to a thousand accidents ; but it is plain, that transient assistances are better than perpetual foundations. The evil is momentary ; it is necessary, therefore, that the succour should be of the same nature, and that it be applied to particular accidents.” Spirit of Laws, b. xxiii ch. 29.

pharmacy and midwifery, are likewise proofs of the declining state of a country. In the infancy of the Roman empire, the priest performed the office of a physician; so simple were the principles and practice of physic. It was only in the declension of the empire that physicians vied with the emperors of Rome in magnificence and splendor*

I am sorry to add in this place, that the number of patients in the HOSPITAL, and incurables in the

It was reserved for the present generation to substitute in the room of public hospitals private DISPENSARIES for the relief of the sick. Philosophy and christianity alike concur in deriving praise and benefit from these excellent institutions. They exhibit something like an application of the mechanical powers to the purposes of benevolence; for in what other charitable institutions do we perceive so great a *quantity* of distress relieved by so small an expence?

* The first regular practitioners of physic in Rome, were women and slaves. The profession was confined to them above six hundred years. The Romans during this period lived chiefly upon vegetables, particularly upon PULSE; and hence they were called, by their neighbours PULIFAGI. They were likewise early inured to the healthy employments of war and husbandry. Their diseases, of course, were too few and simple to render the cure of them an object of a liberal profession. When their diseases became more numerous and
compli-

ALMSHOUSE of this city, show that we are treading in the enervated steps of our fellow subjects in Britain. Our bills of mortality likewise show the encroachments of British diseases upon us. The NERVOUS FEVER has become so familiar to us, that we look upon it as a natural disease. Dr Sydenham, so faithful in his history of fevers, takes no notice of it. Dr Cadwallader informed me, that it made its first appearance in this city about five and twenty years ago. It will be impossible to name the CONSUMPTION without recalling to our minds the memory of some friend or relation, who has perished within these few years by that disorder. Its rapid progress among us has been unjustly attributed to the growing resemblance of our climate to that of Great-Britain. The HYS-TERIC and HYPOCHONDRIAC DISORDERS, once peculiar to the chambers of the great, are now to be found in our kitchens and workshops. All

complicated, their investigation and cure required the aids of philosophy. The profession from this time became liberal; and maintained a rank with the other professions which are founded upon the imperfection and depravity of human institutions. Physicians are as necessary in the advanced stages of society as surgeons, although their office is less ancient and certain. There are many artificial diseases, in which they give certain relief; and even where their art fails, their prescriptions are still necessary, in order to smooth the avenues of death.

these

these diseases have been produced by our having deserted the simple diet, and manners, of our ancestors.

The blessings of literature, commerce, and religion were not *originally* purchased at the expence of health. The complete enjoyment of health is as compatible with civilization, as the enjoyment of civil liberty. We read of countries, rich in every thing that can form national happiness and national grandeur, the diseases of which are nearly as few and simple as those of the Indians. We hear of no diseases among the Jews, while they were under their democratical form of government, except such as were inflicted by a supernatural power*. We should be tempted to doubt the accounts given of the populousness of that people, did we not see the practice of their simple customs producing nearly the same populousness in Egypt, Rome, and other countries of antiquity. The Empire of China, it is said contains more inhabitants than the whole of Europe. The political institutions of that country have exempted

* The principal employments of the Jews, like those of the Romans in their simple ages, consisted in war and husbandry. Their diet was plain, consisting chiefly of vegetables. Their only remedies were plasters and ointments; which were calculated for those diseases which are produced by accidents,

its inhabitants from a large share of the diseases of other civilized nations. The inhabitants of Switzerland, Denmark, Norway* and Sweden, enjoy the chief advantages of civilization without having surrendered for them the blessings of natural health.

accidents. In proportion as they receded from their simple customs, we find artificial diseases prevail among them. The leprosy made its appearance in their journey through the wilderness. King Aſa's pains in his feet, were probably brought on by a fit of the gout. Saul and Nebuchadnezzar were afflicted with a melancholy. In the time of our Saviour, we find an account of all those diseases in Judea, which mark the declension of a people; such as, the palsy, epilepsy, mania, blindness, hemorrhagia uterina, &c. It is unnecessary to suppose, that they were let loose at this juncture, on purpose to give our Saviour an opportunity of making them the chief subject of his miracles. They had been produced from natural causes, by the gradual depravity of their manners. It is remarkable, that our Saviour chose those artificial diseases for the subject of his miracles, in preference to natural diseases. The efforts of nature, and the operation of medicines, are too slow and uncertain in these cases to detract in the least from the validity of the miracle. He cured Peter's mother-in-law, it is true, of a fever; but to shew that the cure was miraculous, the sacred historian adds, (contrary to what is common after a fever) "that she arose *immediately* and ministered unto them."

* In the city of Bergen, which consists of 30,000 inhabitants, there is but one physician; who is supported at the expence of the public. Pontoppidan's Nat. Hist. of Norway.

But

But it is unnecessary to appeal to ancient or remote nations to prove, that health is not incompatible with civilization. The inhabitants of many parts of New England, particularly the province of Connecticut, are strangers to artificial diseases. Some of you may remember the time, and our fathers have told those of us who do not, when the diseases of PENNSYLVANIA were as few and as simple as those of the Indians. The food of the inhabitants was then simple ; their only drink was water ; their appetites were restrained by labour ; religion excluded the influence of sickening passions ; private hospitality supplied the want of a public hospital ; nature was their only nurse, temperance their principal physician. But I must not dwell upon this retrospect of primæval manners ; and I am too strongly impressed with a hope of a revival of such happy days, to pronounce them the golden age of our province.

Our esteem for the customs of our savage neighbours will be lessened, when we add, that civilization does not preclude the honours of old age. The proportion of old people is much greater among civilized, than among savage nations. It would be easy to decide this assertion in our favour, by appealing to facts in the natural histories of Britain, Norway, Sweden, North-

North-America*, and several of the West-India Islands.

The laws of decency and nature, are not necessarily abolished by the customs of civilized nations. In many of these, we read of women among whom nature alone still performs the office of a midwife†, and who feel the obligations of suck-

* It has been urged against the state of longevity in America, that the Europeans, who settle among us, generally arrive to a greater age than the Americans. This is not occasioned so much by a peculiar firmness in their stamina, as by an increase of vigour, which the constitution acquires by a change of climate. A Frenchman (*cæteris paribus*) outlives an Englishman in England. An Hollander prolongs his life by removing to the Cape of Good Hope. A Portuguese gains fifteen or twenty years by removing to Brazil. And there are good reasons to believe, that a North-American would derive the same advantages, in point of health and longevity, by removing to Europe, which an European derives from coming to this country.

From a calculation made by an ingenious foreigner, it appears, that a greater proportion of old-people are to be found in Connecticut, than in any colony in North-America. This colony contains 180,000 inhabitants. They have no public hospitals or poor-houses; nor is a beggar to be seen among them. There cannot be more striking proofs than these facts of the simplicity of their manners.

† Parturition, in the simple ages of all countries, is performed by nature. The Israelitish women were delivered

EVEN

ling their children, to be equally binding with the common obligations of morality.

Civilization does not render us less fit for the necessary hardships of war. We read of armies of civilized nations, who have endured degrees of cold, hunger and fatigue, which have not been exceeded by the savages of any country*.

Civilization does not always multiply the avenues of death. It appears from the bills of mortality, of many countries, that fewer in proportion die among civilized, than among savage nations.

even without the help of the Egyptian midwives. We read of but two women who died in child-birth in the whole history of the Jews. Dr Bancroft says, that child-bearing is attended with so little pain in Guiana, that the women seem to be exempted from the curse inflicted upon Eve. These easy births are not confined to warm climates. They are equally safe and easy in Norway and Iceland, according to Pontoppidan and Anderson's histories of those countries.

* Civilized nations have, in the end, always conquered savages as much by their ability to bear hardships, as by their superior military skill. Soldiers are not to be chosen indiscriminately. The greatest generals have looked upon sound constitutions to be as essential to soldiers, as bravery or military discipline. Count Saxe refused soldiers born and bred in large cities; and fought for such only as were bred in mountainous countries. The King of Prussia calls young
soldiers

Even the charms of beauty are heightened by civilization. We read of stateliness, proportion, and fine teeth* and complexions in both sexes, forming the principal outlines of national characters.

The danger of many diseases, is not proportioned to their violence, but to their duration. America has advanced but a few paces in luxury and effeminacy. There is yet strength enough in her vitals to give life to those parts which are

foldiers only to the dangers and honours of the field in his elegant poem, *Sur l'Art de la Guerre*, chant. 1. Old soldiers generally lose the advantages of their veteranism, by their habits of idleness and debauchery. An able general, and experienced officers, will always supply the defects of age in young soldiers.

* Bad teeth are observed chiefly in middle latitudes, which are subject to alternate heats and colds. The inhabitants of Norway and Russia are as remarkable for their fine teeth as the inhabitants of Africa. We observe fine teeth to be universal likewise among the inhabitants of France, who live in a *variable* climate. These have been ascribed to their protecting their heads from the action of the night air by means of woollen night-caps, and to the extraordinary attention to the teeth of their children. These precautions secure good teeth; and are absolutely necessary in all variable climates where people do not adopt all the customs of the savage life.

decayed. She may recall her steps. For this purpose,

I. Let our children be educated in a manner more agreeable to nature.

II. Let the common people (who constitute the wealth and strength of our country) be preserved from the effects of spirituous liquors. Had I a double portion of all that eloquence which has been employed in describing the political evils that lately threatened our country, it would be too little to set forth the numerous and complicated *physical* and *moral* evils which these liquors have introduced among us. To encounter this *hydra* requires an arm accustomed like that of Hercules to vanquish monsters. Sir William Temple tells us, that in Spain no man can be admitted as an evidence in a court, who has once been convicted of drunkenness. I do not call for so severe a law in this country. Let us first try the force of severe manners. Lycurgus governed more by these, than by his laws. “*Boni mores non bonæ leges,*” according to Tacitus, were the bulwarks of virtue among the ancient Germans.

III. I despair of being able to call the votaries of Bacchus from their bottle, and shall therefore

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leave them to be roused by the more eloquent twinges of the gout.

IV. Let us be cautious what kind of manufactures we admit among us. The rickets made their first appearance in the manufacturing towns in England. Dr Fothergill informed me, that he had often observed, when a pupil, that the greatest part of the chronic patients in the London Hospital were Spittal-field weavers. I would not be understood, from these facts, to discourage those manufacturers which employ women and children: these suffer few inconveniences from a sedentary life: nor do I mean to offer the least restraint to those manufactories among men, which admit of free air, and the exercise of all their limbs. Perhaps a pure air and the abstraction of spirituous liquors might render sedentary employments less unhealthy in America, even among men, than in the populous towns of Great-Britain.

The population of a country is not to be accomplished by rewards and punishments. And it is happy for America, that the universal prevalence of the protestant religion, the checks lately given to negro slavery, the general unwillingness among us to acknowledge the usurpations of primogeniture, the universal practice of inoculation for the
small-

small-pox, and the absence of the plague, render the interposition of government for that purpose unnecessary.

These advantages can only be secured to our country by AGRICULTURE. This is the true basis of national health, riches and populousness. Nations, like individuals, never rise higher than when they are ignorant whither they are tending. It is impossible to tell from history, what will be the effects of agriculture, industry, temperance, and commerce, urged on by the competition of colonies, united in the same general pursuits, in a country, which for extent, variety of soil, climate, and number of navigable rivers, has never been equalled in any quarter of the globe. America is the theatre where human nature will probably receive her last and principal literary, moral and political honours.

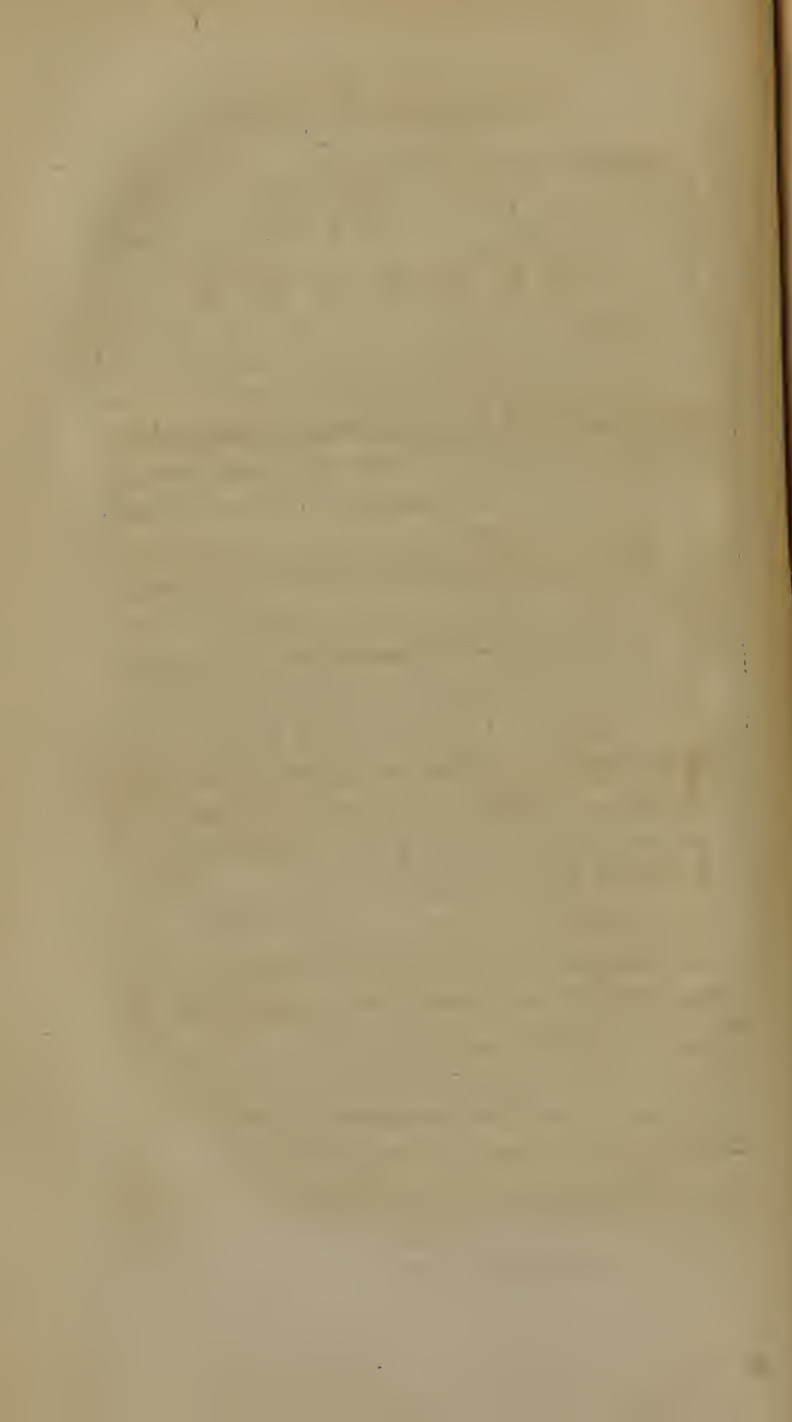
But I recall myself from the ages of futurity. The province of Pennsylvania has already shewn to her sister colonies, the influence of agriculture and commerce upon the number and happiness of a people. It is scarcely an hundred years since our illustrious legislator, with an handful of men, landed upon these shores. Although the perfection of our government, the healthiness of our climate,

and the fertility of our soil, seemed to ensure a rapid settlement of the province; yet it would have required a prescience bordering upon divine, to have foretold, that in such a short space of time, the province would contain above 300,000 inhabitants; and that near 30,000 of this number should compose a city, which should be the third, if not the second in commerce in the British empire. The pursuits of literature require leisure and a total recess from clearing forests, planting, building, and all the common toils of settling a new country: but before these arduous works were accomplished, the SCIENCES, ever fond of the company of liberty and industry, chose this spot for the seat of their empire in this new world. Our COLLEGE, so catholic in its foundation, and extensive in its objects, already sees her sons executing offices in the highest departments of society. I have now the honour of speaking in the presence of a most respectable number of philosophers, physicians, astronomers, botanists, patriots, and legislators; many of whom have already seized the prizes of honour, which their ancestors had allotted to a much later posterity. Our first offering had scarcely found its way into the temple of fame, when the oldest societies in Europe turned their eyes upon us, expecting with impatience to see the mighty fabric of science, which like a well
built

built arch, can only rest upon the whole of its materials, completely finished from the treasures of this unexplored quarter of the globe.

It reflects equal honour upon our society and the honourable assembly of our province, to acknowledge, that we have always found the latter willing to encourage by their patronage, and reward by their liberality, all our schemes for promoting useful knowledge. What may we not expect from this harmony between the sciences and government! Methinks I see canals cut, rivers once impassible rendered navigable, bridges erected, and roads improved, to facilitate the exportation of grain. I see the banks of our rivers vying in fruitfulness with the banks of the river of Egypt. I behold our farmers, nobles; our merchants princes. But I forbear—Imagination cannot swell with the subject.

I beg leave to conclude, by deriving an argument from our connection with the legislature, to remind my auditors of the duty they owe to the society. Patriotism and literature are here connected together; and a man cannot neglect the one without being destitute of the other. Nature and our ancestors have completed their works among us; and have left us nothing to do, but to enlarge and perpetuate our own happiness.



A N

A C C O U N T

O F T H E

CLIMATE OF PENNSYLVANIA;

AND ITS

INFLUENCE UPON THE HUMAN BODY.

IN order to render the observations upon the epidemic diseases which compose a part of this volume more useful, it will be necessary to prefix to them a short account of the climate of Pennsylvania, and of its influence upon the human body. This account may perhaps serve further, to lead to future discoveries, and more extensive observations, upon this subject.

The state of Pennsylvania lies between $39^{\circ} 43' 25''$, and 42° north latitude, including, of course, $2^{\circ} 16' 35''$, equal to 157 miles from its southern

to its northern boundary. The western extremity of the state is in the longitude of $5^{\circ} 23' 40''$, and the eastern, is that of $27'$ from the meridian of Philadelphia, comprehending in a due west course 311 miles, exclusive of the territory lately purchased by Pennsylvania from the United States, of which as yet no accurate surveys have been obtained. The state is bounded on the south by part of the state of Delaware, by the whole state of Maryland, and by Virginia to her western extremity. The last named state, the territory lately ceded to Connecticut, and Lake Erie, (part of which is included in Pennsylvania) form the western and north-western boundaries of the state. Part of New-York and the territory lately ceded to Pennsylvania, with a part of Lake Erie, compose the northern, and another part of New-York, with a large extent of New-Jersey (separated from Pennsylvania by the river Delaware) compose the eastern boundaries of the state. The lands which form these boundaries (except a part of the states of Delaware, Maryland, and New-Jersey) are in a state of nature. A large tract of the western and north-eastern parts of Pennsylvania are nearly in the same uncultivated situation.

The state of Pennsylvania is intersected and diversified with numerous rivers, and mountains. To
describe

describe, or even to name them all, would far exceed the limits I have proposed to this account of our climate. It will be sufficient only to remark, that one of these rivers, viz. the Susquehannah, begins at the northern boundary of the state, twelve miles from the river Delaware, and winding several hundred miles through a variegated country, enters the state of Maryland on the Southern line, fifty eight miles westward of Philadelphia; that each of these rivers is supplied by numerous streams of various sizes; that tides flow in parts of two of them, viz. in the Delaware and Schuylkill; that the rest rise and fall alternately in wet and dry weather; and that they descend with great rapidity, over prominent beds of rocks in many places, until they empty themselves into the bays of Delaware and Chesapeak on the east, and into the Ohio on the western part of the state.

The mountains form a considerable part of the state of Pennsylvania. Many of them appear to be reserved as perpetual marks of the original empire of nature in this country. The Allegany, which crosses the state about two hundred miles from Philadelphia, in a north inclining to east course, is the most considerable and extensive of these mountains. It is called by the Indians the backbone of the continent. Its height in different places

places is supposed to be about 1300 feet from the adjacent plains.

The soil of Pennsylvania is diversified by its vicinity to mountains and rivers. The vallies and bottoms consist of a black mould, which extends from a foot to four feet in depth. But in general a deep clay forms the surface of the earth. Immense beds of limestone lie beneath this clay in many parts of the state. This account of the soil of Pennsylvania is confined wholly to the lands on the east side of the Allegany mountain. The soil on the west side of this mountain shall be described in another place.

The city of Philadelphia lies in the latitude of $39^{\circ} 57'$, in longitude $75^{\circ} 8'$ from Greenwich, and fifty five miles west from the Atlantic ocean.

It is situated about four miles due north from the conflux of the rivers Delaware and Schuylkill. The buildings which consist chiefly of brick, extend nearly three miles north and south along the Delaware, and above half a mile due west towards the Schuylkill, to which river the limits of the city extend; the whole of which include a distance of two miles from the Delaware. The land near the rivers, between the city and the conflux of the
rivers,

rivers, is in general low, moist and subject to be overflowed. The greatest part of it is meadow ground. The land to the northward and westward, in the vicinity of the city, is high, and in general well cultivated. Before the year 1778 the ground between the present improvements of the city, and the river Schuylkill, was covered with woods. These together with large tracts of wood to the northward of the city, were cut down during the winter the British army had possession of Philadelphia. I shall hereafter mention the influence which the cutting down of these woods, and the subsequent cultivation of the grounds in the neighbourhood of the city, have had upon the health of its inhabitants.

The mean height of the ground on which the city stands, is about forty feet above the river Delaware. One of the longest and most populous streets in the city, rises only a few feet above the river. The air at the north is much purer than at the south end of the city; hence the lamps exhibit a fainter flame in its southern than its northern parts.

The tide of the Delaware seldom rises more than six feet. It flows four miles in an hour. The width of the river near the city is about a mile.

The

The city with the adjoining districts of Southwark and the Northern Liberties contain between 40 and 50,000 inhabitants.

From the accounts which have been handed down to us by our ancestors, there is reason to believe that the climate of Pennsylvania has undergone a material change. Thunder and lightning are less frequent, and the cold of our winters and heat of our summers are less uniform, than they were forty or fifty years ago. Nor is this all. The springs are much colder, and the autumns more temperate than formerly, insomuch that cattle are not housed so soon by one month as they were in former years. Within the last eight years, there have been some exceptions to part of these observations. The winter of the year 1779, 80, was uniformly and uncommonly cold. The river Delaware was frozen near three months during this winter, and public roads for waggons and sleighs connected the city of Philadelphia in many places with the Jersey shore. The thickness of the ice in the river near the city, was from sixteen to nineteen inches, and the depth of the frost in the ground was from four to five feet, according to the exposure of the ground and the quality of the soil. This extraordinary depth of the frost in the earth, compared with its depth in more northern

thern and colder countries, is occasioned by the long delay of snow, which leaves the earth without a covering during the last autumnal and the first winter months. Many plants were destroyed by the intenseness of the cold during this winter. The ears of horned cattle and the feet of hogs exposed to the air, were frost-bitten; squirrels perished in their holes, and partridges were often found dead in the neighbourhood of farm houses. The mercury in January stood for several hours at 5° below 0, in Farenheit's thermometer; and during the whole of this month, (except on one day) it never rose in the city of Philadelphia so high as to the freezing point.

The cold in the winter of the year 1783, 4, was as intense but not so steady, as it was in the winter that has been described. It differed from it materially in one particular, viz. there was a thaw in the month of January which opened all our rivers for a few days.

The summer which succeeded the winter of 1779, 80, was uniformly warm. The mercury in the thermometer, during this summer, stood on one day (the 15th of August) at 95° , and fluctuated between 93° and 80° for many weeks. The thermometer, in every reference that has been, or shall

shall be made to it, stood in the shade in the open air.

I know it has been said by many old people, that the winters in Pennsylvania are less cold, and the summers less warm, than they were forty or fifty years ago. The want of thermometrical observations before and during those years, renders it difficult to decide this question. Perhaps the difference of clothing and sensation between youth and old age, in winter and summer, may have laid the foundation of this opinion. I suspect the mean temperature of the air in Pennsylvania has not altered, but that the principal change in our climate consists in the heat and cold being less confined than formerly to their natural seasons. I adopt the opinion of Doctor Williamson * respecting the diminution of the cold in the southern, being occasioned by the cultivation of the northern parts of Europe ; but no such cultivation has taken place in the countries which lie to the north-west of Pennsylvania, nor do the partial and imperfect improvements which have been made in the north-west parts of the state, appear to be sufficient to lessen the cold, even in the city of Philadelphia. I have been able to collect no facts, which dispose

* American Philosophical Transactions, vol. I.

me to believe that the winters were colder before the year 1740, than they have been since. In the memorable winter of 1739, 40, the Delaware was crossed on the ice in sleighs on the 5th of March, old style, and did not open till the 13th of the same month. The ground was covered during this winter with a deep snow, and the rays of the sun were constantly obscured by a mist, which hung in the upper regions of the air. In the winter of 1779, 80, the river was navigable on the 4th of March; the depth of the snow was moderate, and the gloominess of the cold was sometime suspended for a few days by a cheerful sun. From these facts it is probable the winter of 1739, 40, was colder than the winter of 1779, 80.

Having premised these general remarks, I proceed to observe, that there are seldom more than twenty or thirty days in summer or winter in Pennsylvania in which the mercury rises above 80° in the former, or falls below 30° in the latter season. Some old people have remarked that the number of *extremely* cold and warm days in successive summers and winters, bears an exact proportion to each other. This was strictly true in the years 1787 and 1788.

The

The warmest part of the day in summer is at two, in ordinary, and at three o'clock in the afternoon in extremely warm weather. From these hours the heat gradually diminishes till the ensuing morning. The coolest part of the four and twenty hours is at the break of day. There are seldom more than three or four nights in a summer in which the heat of the air is nearly the same as in the preceding day. After the warmest days, the evenings are generally agreeable, and often delightful. The higher the mercury rises in the day time, the lower it falls the succeeding night. The mercury at 80° generally falls to 68° , while it descends, when at 60° only to 56° . This disproportion between the temperature of the day and night, in summer is always greatest in the month of August. The dews at this time are heavy in proportion to the coolness of the evening. They are sometimes so considerable as to wet the clothes; and there are instances in which marsh-meadows, and even creeks, which have been dry during the summer, have been supplied with their usual waters from no other source than the dews which have fallen in this month, or in the first weeks of September.

There is another circumstance connected with the one just mentioned, which contributes very much to mitigate the heat of summer, and that is,

it seldom continues more than two or three days without being succeeded with showers of rain, accompanied sometimes by thunder and lightning, and afterwards by a north-west wind, which produces a coolness in the air that is highly invigorating and agreeable.

The warmest weather is *generally* in the month of July. But intensely warm days are often felt in May, June, August and September. In the annexed table of the weather for the year 1787, there is an exception to the first of these remarks. It shews that the mean heat of August was greater by a few degrees than that of July.

The transitions from heat to cold are often very sudden, and sometimes to very distant degrees. After a day in which the mercury has stood at 86° and even 90° , it sometimes falls in the course of a single night to the 65th, and even to the 60th degree, insomuch that fires have been found necessary the ensuing morning, especially if the change in the temperature of the air has been accompanied by rain and a south-east wind. In a summer month in the year 1775, the mercury was observed to fall 20° in an hour and an half. There are few summers in which fires are not agreeable during some parts of them. My inge-

nious friend Mr. David Rittenhouse, whose talent for accurate observation extends alike to all subjects, informed me, that he had never passed a summer, during his residence in the country, without discovering frost in every month of the year, except July.

The weather is equally variable in Pennsylvania during the greatest part of the winter. The mercury fell from 37° to $4\frac{1}{2}^{\circ}$ below 0, in four and twenty hours, between the fourth and fifth of February 1788. In this season nature seems to play at cross purposes. Heavy falls of snow are often succeeded in a few days by a general thaw, which frequently in a short time leaves no vestige of the snow. The rivers Delaware, Schuylkill and Susquehannah have sometimes been frozen (so as to bear horses and carriages of all kinds) and thawed so as to be passable in boats, two or three times in the course of the same winter. The ice is formed for the most part in a gradual manner, and seldom till the water has been previously chilled by a fall of snow. Sometimes its production is more sudden. On the night of the 31st of December 1764, the Delaware was completely frozen over between ten o'clock at night and eight the next morning, so as to bear the weight of a man. An unusual vapour like a fog was seen to rise
from

from the water, in its passage from a fluid to a solid state.

This account of the variableness of the weather in winter, does not apply to every part of Pennsylvania. There is a line about the 41° of the state, beyond which the winters are steady and regular, inasmuch that the earth there is seldom without a covering of snow during the three winter months. In this line the climate of Pennsylvania forms a union with the climate of the eastern and northern states.

The time in which frost and ice begin to shew themselves in the neighbourhood of Philadelphia, is generally about the latter end of October or the beginning of November. But the intense cold seldom sets in till about the 20th or 25th of December; hence the common saying, "as the day lengthens the cold strengthens." The coldest weather is commonly in January. The navigation of the river Delaware, after being frozen, is seldom practicable for large vessels, before the first week in March.

As in summer there are often days in which fires are agreeable, so there are sometimes days in winter in which they are disagreeable. Vegetation

has been observed in all the winter months. Garlic was tasted in butter in January 1781. The leaves of the willow, the blossoms of the peach tree, and the flowers of the dandelion and the crocus, were all seen in February 1779; and I well recollect, about thirty-two years ago, to have seen an apple-orchard in full bloom, and small apples on many of the trees, in the month of December.

A cold day in winter is often succeeded by a moderate evening. The coldest part of the four and twenty hours is generally at the break of day.

In the most intense cold which has been recorded in Philadelphia, within the last twenty years, the mercury stood at 5° below 0. But it appears from the accounts published by Messieurs Mafon and Dixon, in the 58th volume of the Transactions of the Royal Society of London, that the mercury stood at 22° below 0 on the 2d of January 1767, at Brandywine, about thirty miles to the westward of Philadelphia. They inform us, that on the first of the same month the mercury stood at 20° , and on the day before at 7° below 0. I have to lament that I am not able to procure any record of the temperature of the air in the same year in Philadelphia. From the variety in the height and quality of the soil, and
from

from the difference in the currents of winds and the quantity of rain and snow which fall in different parts of the state, it is very probable this excessive cold may not have extended thirty miles from the place where it was first perceived.

The greatest degree of heat upon record in Philadelphia, is 95° .

The standard temperature of the air in the city of Philadelphia is $52\frac{1}{2}^{\circ}$, which is the temperature of our deepest wells, as also the mean heat of our common spring water.

The spring in Pennsylvania is generally less pleasant than in many other countries. In March the weather is stormy, variable and cold. In April, and sometimes in the beginning of May, it is moist, and accompanied by a degree of cold which has been called *rawness*, and which from its disagreeable effects upon the temper has been called the *sirocco* of this country. From the variable nature of the weather in the spring, vegetation advances very differently in different years. The colder the spring, the more favourable it proves to the fruits of the earth. The hopes of the farmer from his fruit-trees in a warm spring are often blasted by a frost in April and May. A

fall of snow is remembered with regret by many of them on the night between the third and fourth of May in the year 1774. The colder the winter, the greater delay we observe in the return of the ensuing spring.

Sometimes the weather during the spring months is cloudy and damp, attended occasionally with a gentle fall of rain resembling the spray from a cataract of water. A day of this species of weather is called, from its resemblance to a damp day in Great-Britain, "an English day." This damp weather seldom continues more than three or four days. The month of May 1786, will long be remembered, for having furnished a very uncommon instance of the absence of the sun for fourteen days, and of constant damp or rainy weather.

The month of June is the only month in the year which resembles a spring month in the southern countries of Europe. The weather is then generally temperate, the sky is serene, and the verdure of the country is universal and delightful.

The autumn is the most agreeable season in the year in Pennsylvania. The cool evenings and mornings, which generally begin about the first week in September, are succeeded by a moderate
tempera-

temperature of the air during the day. This species of weather continues with an increase of cold scarcely perceptible, till the middle of October, when the autumn is closed by rain, which sometimes falls in such quantities as to produce destructive freshes in the rivers and creeks, and sometimes descends in gentle showers, which continue with occasional interruptions by a few fair days, for two or three weeks. These rains are the harbingers of the winter; and the Indians have long ago taught the inhabitants of Pennsylvania, that the degrees of cold during the winter, are in proportion to the quantity of rain which falls during the autumn*.

From this account of the temperature of the air in Pennsylvania, it is evident that there are seldom

* I cannot help agreeing with Mr Kirwan, in one of his remarks upon the science of meteorology in the preface to his estimate of the temperature of different latitudes. “ This science (says he) if brought to perfection would enable us at least to foresee those changes in the weather which we could not prevent. Great as is the distance between such knowledge, and our own present attainments, we have no reason to think it above the level of the powers of the human mind. The motions of the planets must have appeared as perplexed and intricate to those who first contemplated them; yet by persevering industry, they are now known to the utmost precision. The present is (as the great Leibnitz expresses it) in every case pregnant with

more than four months in which the weather is agreeable without a fire.

In winter the winds generally come from the north-west in *fair*, and from the north-east in *wet* weather. The north-west winds are uncommonly dry as well as cold. It is in consequence of the violent action of these winds that trees have uniformly a thicker and more compact bark on their northern than on their southern exposures. Even brick houses are affected by the force and dryness of these north-west winds: hence it is much more difficult to demolish the northern than the southern walls of an old brick house. This fact was communicated to me by an eminent bricklayer in the city of Philadelphia.

The winds in fair weather in the spring, and in warm weather in the summer, blow from the south-west and from west-north-west. The *raw* air before mentioned comes from the north-east. The south-west winds likewise usually bring with them those showers of rain in the spring and sum-

“the future, and the connection must be found by long and attentive observation.”

The influence which the perfection of this science must have upon health, agriculture, navigation and commerce, is too obvious to be mentioned.

mer which refresh the earth. They moreover moderate the heat of the weather, provided they are succeeded by a north-west wind. Now and then showers of rain come from the west-north-west.

There is a common fact connected with the account of the usual winds in Pennsylvania, which it may not be improper to mention in this place. While the clouds are seen flying from the south-west, the *scud*, as it is called, or a light vapour, is seen at the same time flying below the clouds from the north-east.

The moisture of the air is much greater than formerly, occasioned probably by the exhalations which in former years fell in the form of snow, now descending in the form of rain. The depth of the snow is sometimes between two and three feet, but in general seldom exceeds between six and nine inches.

Hail frequently descends with snow in winter. Once in four or five years large and heavy showers of hail fall in the spring and summer. They generally run in narrow veins (as they are called) of thirty or forty miles in length, and two or three miles in breadth. The heaviest shower of hail that
is

is remembered in Philadelphia, did not extend in breadth more than half a mile north and south. Some of the stones weighed half an ounce. The windows of many houses were broken by them. This shower fell in May 1783.

From sudden changes in the air, rain and snow often fall together, forming what is commonly called *fleet*.

In the uncultivated parts of the state, the snow sometimes lies on the ground till the first week in April. The backwardness of the spring has been ascribed to the passage of the air over the undissolved beds of snow and ice which usually remain, after the winter months are past, on the north-west grounds and waters of the state, and of the adjacent country.

The dissolution of the ice and snow in the spring is sometimes so sudden as to swell the creeks and rivers in every part of the state to such a degree, as not only to lay waste the hopes of the husbandman from the produce of his lands, but in some instances to sweep his barns, stables, and even his dwelling house into their currents*. The

* The following account of the thaw of the river Susquehannah, in the spring of 1784, was published by the author in the Columbian Magazine for November 1786. It may serve

wind during a general thaw, comes from the south-west or south-east.

to illustrate a fact related formerly in the History of the winters in Pennsylvania, as well as to exhibit an extraordinary instance of the destructive effects of a sudden thaw.

“ The winter of 1783-4, was uncommonly cold, inso-much that the mercury in Farenheit’s thermometer stood several times at 5 degrees below 0. The snows were frequent; and, in many places, from two to three feet deep, during the greatest part of the winter. All the rivers in Pennsylvania were frozen, so as to bear waggons and sleds with immense weights. In the month of January a thaw came on suddenly, which opened our rivers so as to set the ice a-driving, to use the phrase of the country. In the course of one night, during the thaw, the wind shifted suddenly to the north-west, and the weather became intensely cold. The ice which had floated the day before, was suddenly obstructed; and in the river Susquehannah, the obstructions were formed in those places where the water was most shallow, or where it had been accustomed to fall. This river is several hundred miles in length, and from half a mile to a mile and an half in breadth, and winds through a hilly, and in many places a fertile and highly cultivated country. It has as yet a most difficult communication with our bays and the sea, occasioned by the number and height of the falls which occur near the mouth of the river. The ice in many places, especially where there were falls, formed a kind of dam, of a most stupendous height. About the middle of March our weather moderated, and a thaw became general. The effects of it were remarkable in all our rivers; but in none so much as in the river I have mentioned. I shall therefore endeavour in a few words to describe them. Unfortunately the dams of ice did not give way
all

The air, when dry in Pennsylvania, has a peculiar elasticity, which renders the heat and cold less insupportable than the same degrees of both are in moister countries. It is in those cases only when summer showers are not succeeded by north-west winds, that the heat of the air becomes oppressive and distressing, from being combined with moisture.

all at once, nor those which lay nearest to the mouth of the river, first. While the upper dams were set a-float by the warm weather, the lower ones, which were the largest, and in which, of course, the ice was most impacted, remained fixed. In consequence of this, the river rose in a few hours, in many places, above 30 feet; rolling upon its surface large lumps of ice from 10 to 40 cubic feet in size. The effects of this sudden inundation were terrible. Whole farms were laid under water. Barns—stables—horses—cattle—fences—mills of every kind, and in one instance, a large stone house, 40 by 30 feet, were carried down the stream. Large trees were torn up by the roots—several small islands covered with woods, were swept away, and not a vestige of them was left behind. On the barns which preserved their shape, in some instances, for many miles were to be seen living fowls; and, in one dwelling, a candle was seen to burn for some time, after it was swept from its foundation. Where the shore was level, the lumps of ice, and the ruins of houses and farms, were thrown a quarter of a mile from the ordinary height of the river. In some instances, farms were ruined by the mould being swept from them by the cakes of ice, or by depositions of sand; while others were enriched by large depositions of mud. The damage, upon the whole, done to the state of

Pennsylvania

From tradition, as well as living observation, it is evident, that the waters in many of the creeks in Pennsylvania have diminished considerably within the last fifty years. Hence many mills, erected upon large and deep streams of water, now stand idle in dry weather; and many creeks, once navigable in large boats, are now impassable even in canoes. This diminution of the waters has been ascribed to the application of a part of them to the purpose of making meadows.

The mean elevation of the barometer in Philadelphia, is about 30 inches. The variations in the barometer are very inconsiderable in the greatest changes of the weather, which occur in the city of Philadelphia. During the violent and destructive storm which blew from the south-west on the 11th of November 1788, it suddenly fell from 30 to $29\frac{1}{4}$. Mr. Rittenhouse informs me, that long and faithful observations have satisfied him,

Pennsylvania by this fresh, was very great. In most places it happened in the day time, or the consequences must have been fatal to many thousands.

“ I know of but one use that can be derived from recording the history of this inundation. In case of similar obstructions of rivers, from causes such as have been described, the terrible effects of their being set in motion by means of a general thaw may in part be obviated, by removing such things out of the course of the water and ice as are within
our

that the alterations in the height of the mercury in the barometer do not *precede* but always *succeed* changes in the weather. It falls with the south and south-west, and rises with the north and north-west winds.

The quantity of water which falls in rain and snow, one year with another, amounts to from 24 to 36 inches. But to complete the account of variable qualities in the climate, it will be necessary to add, that our summers and autumns are sometimes marked by a *deficiency*, and sometimes by an *excessive* quantity of rain. The summer and autumn of 1782 were uncommonly dry. Near two months elapsed without a single shower of rain. There were only two showers in the whole months of September and October. In consequence of this dry weather, there was no second crop of hay. The Indian corn failed of its increase in many places, and was cut down for food for cattle. Trees newly planted, died. The pasture fields not only lost their verdure, but threw up small clouds of dust when agitated by the feet of men, or beasts. Cattle in some instances were driven many miles to be watered, every morning

our power; particularly cattle, hay, grain, fences, and farming utensils of all kinds."

and

and evening*. The earth became so inflammable in some places, as to burn above a foot below its surface. A complete consumption of the turf by an accidental fire kindled in the adjoining state of New-Jersey, spread terror and distress through a large tract of country. Springs of water and large creeks were dried up in many parts of the state. Rocks appeared in the river Schuylkill which had never been observed before, by the oldest persons then alive. On one of them were cut the figures 1701. The atmosphere, during part of this dry weather, was often filled, especially in the mornings, with a thin mist†, which while it deceived with the expectation of rain, served the valuable purpose of abating the heat of the sun. I am sorry that I am not able to furnish the mean heat of each of the summer months. My notes of the weather enable me to add nothing further upon this subject, than that the summer was “uncommonly cool.”

* It was remarked during this dry weather, that the sheep were uncommonly fat, and their flesh well tasted, while all the other domestic animals languished from the want of grass and water.

† A similar mist was observed in France by Dr Franklin, in the summer of 1782. The winter which succeeded it was uncommonly cold in France, as well as in Pennsylvania.

The summer of the year 1788 afforded a remarkable instance of *excess* in the quantity of rain which sometimes falls in Pennsylvania. Thirteen days are marked with rain in July in the records of the weather kept at Spring-Mill. There fell on the 18th and 19th of August seven inches of rain in the city of Philadelphia. The wheat suffered greatly by the constant rains of July in the eastern and middle parts of the state. So unproductive a harvest in grain, from wet weather, had not been known, it is said, in the course of the last 70 years. The heat of the air during these summer months was very moderate. Its mean temperature at Spring-Mill was 67,8 in June, 74,7 in July, and only 70,6 in August.

It is some consolation to a citizen of Pennsylvania, in recording facts which seem to militate against our climate, to reflect that the difference of the weather in different parts of the state at the same season, is happily accommodated to promote an increase of the same objects of agriculture; and hence a deficiency of crops has never been known in any one year throughout the *whole* state.

The aurora borealis and meteors are seen occasionally in Pennsylvania. In the present imperfect state of our knowledge of their influence upon the human body, it will be foreign to the design

design of this history of our climate to describe them.

Storms and hurricanes are not unknown in Pennsylvania. They occur once in four or five years, but they are most frequent and destructive in the autumn. They are generally accompanied by rain. Trees are torn up by the roots, and the rivers and creeks are sometimes swelled so suddenly as to do considerable damage to the adjoining farms. The wind, during these storms, generally blows from the south-east and south-west. In the storms which occurred in September 1769, and in the same month of the year 1785, the wind veered round contrary to its usual course, and blew from the north.

After what has been said, the character of the climate of Pennsylvania may be summed up in a few words. There are no two successive years alike. Even the same successive seasons and months differ from each other every year. Perhaps there is but one steady trait in the character of our climate, and that is, it is uniformly variable.

To furnish the reader with a succinct view of the weather in Pennsylvania, that includes all the articles that have been mentioned, I shall here,

subjoin a table containing the result of meteorological observations made near the river Schuylkill, for one year, in the neighbourhood of Philadelphia, by an ingenious French gentleman*, who divides his time between rural employments and useful philosophical pursuits. This table is extracted from the *Columbian magazine* for February 1788. The height of Spring-Mill above the city of Philadelphia, is supposed to be about 70 feet

* Mr. Legeaux.

METEOROLOGICAL OBSERVATIONS, made at SPRING-MOUNT, 18° 28' N. 75° 50' W. of Philadelphia. Result of the Year 1787.

| MONTH. | THERMOMETER. | | BAROMETER. | WIND. | DAYS. | | | | WATER of RAIN and snow, | WEATHER. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | of <i>Fahrenheit</i> , mean degree D. $\frac{1}{10}$ 0 | de <i>Reaumur</i> , degres moyens D. $\frac{1}{10}$ 0 | | | mean height. in. fts. $\frac{1}{10}$ | of aur. bor. | of rain. | of thunder. | | | of snow. | of tempest. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| January | 35 | 1 | 29 | Variable till | 7 | 1 | 4 | 3 | 3 | 10 | Fair, still, cold, and snow. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| February | 33 | 8 | 29 | NE | 3 | 3 | 3 | 2 | 3 | 7 | Fair, overcast. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| March | 45 | 1 | 29 | W | 6 | 6 | 3 | 2 | 2 | 4 | Fair, windy. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| April | 54 | 3 | 29 | Still, SW | 3 | 2 | 1 | 2 | 1 | 2 | Fair, and very dry. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| May | 61 | 2 | 29 | Still, WSW | 14 | 6 | 1 | 2 | 4 | 11 | Foggy, cold, and wet. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| June | 70 | 7 | 29 | WNW | 9 | 1 | 1 | 2 | 4 | 10 | Very fair and growing weather. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| July | 72 | 2 | 29 | WWSW vari. | 1 | 5 | 2 | 1 | 3 | 1 | Fair, and overcast. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| August | 74 | 5 | 29 | W | 11 | 4 | 1 | 1 | 5 | 2 | Very fair, and cloudy. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| September | 64 | 7 | 29 | WNW | 6 | 1 | 1 | 1 | 2 | 7 | Fair weather. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| October | 51 | 1 | 29 | WNW variab. | 1 | 4 | 1 | 1 | 2 | 7 | Foggy, fair, and dry weather. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| November | 45 | 1 | 29 | Still, variable. | 1 | 5 | 1 | 1 | 2 | 6 | Very fair. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| December | 34 | 9 | 29 | WNW | 7 | 7 | 1 | 1 | 9 | 9 | Very fair, and very dry. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 3 July, greatest D. of heat. | | 3 July plus G. D. de chaud. | 2 Febr. least elevation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | | 40 | 1 | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 3 July, greatest D. of heat. | | 3 July plus G. D. de chaud. | 2 Febr. least elevation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 3 July, greatest D. of heat. | | 3 July plus G. D. de chaud. | 2 Febr. least elevation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 91 | | 40 | 1 | | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 3 July, greatest D. of heat. | | 3 July plus G. D. de chaud. | 2 Febr. least elevation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | | 28 | 29 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Variation. | | Variation. | Variation. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Temperature. | | Temperature. | | Mean elevat. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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It is worthy of notice, how near the mean heat of the year, and of the month of April, in two successive years, are to each other in the same place. The mean heat of April 1787 was $54^{\circ}3$, that of April 1788 was $52^{\circ}2$. By the table of the mean heat of each month in the year, it appears that the mean heat of 1787 was $53^{\circ}5$ at Spring-Mill.

The following accounts of the climates of Pekin and Madrid, which lie within a few minutes of the same latitude as Philadelphia, may serve to shew how much climates are altered by local and relative circumstances. The account of the temperature of the air at Pekin will serve further to shew, that with all the advantages of the highest degrees of cultivation which have taken place in China, the winters are colder, and the summers warmer there than in Pennsylvania, principally from a cause which will probably operate upon the winters of Pennsylvania for many centuries to come, viz. the vicinity of an uncultivated north-west country.

“ PEKIN, lat. $39^{\circ}54'$, long. $116^{\circ}29'$ W.

“ By five years observations its annual mean temperature was found to be $55^{\circ}5'$.

| | | | |
|--------------|--------|---------------|-------|
| January - - | 20°,75 | July - - | 84°,8 |
| February - - | 32 | August - - | 83 |
| March - - | 48 | September - - | 63 |
| April - - | 59 | October - - | 52 |
| May - - | 72 | November - - | 41 |
| June - - | 83,75 | December - - | 27 |

“ The temperature of the Atlantic under this parallel is 62, but the standard of this part of the globe is the North Pacific, which is here 4 or 5 degrees colder than the Atlantic. The Yellow Sea is the nearest to Pekin, being about 200 miles distant from it; but it is itself cooled by the mountainous country of Corea, which interposes between it and the ocean, for a considerable part of its extent. Besides, all the northern parts of China (in which Pekin lies) must be cooled by the vicinity of the mountains of Chinese Tartary, among which the cold is said to be excessive.

“ The greatest cold usually experienced during this period, was 5°, the greatest heat, 98°: on the 25th of July 1773, the heat arose to 108° and 110°; a N. E. or N. W. wind produces the greatest cold, a S. or S. W. or S. E. the greatest heat*.”

* “ 6 Mem. Scav. Etrang. p. 528.”

“MADRID, lat. $40^{\circ} 25'$ long. $3^{\circ} 20'$ E.

“The usual heat in summer is [said to be from 75 to 85° ; even at night it seldom falls below 70° ; the mean height of the barometer is $27,96$. It seems to be about 1900 feet above the level of the sea*.”

The above accounts are extracted from Mr. Kirwan's useful and elaborate estimate of the temperature of different latitudes.

The history which has been given of the climate of Pennsylvania, is confined chiefly to the country on the east side of the Allegany mountain. On the west side of this mountain, the climate differs materially from that of the southeastern parts of the state in the temperature of the air, in the effects of the winds upon the weather, and in the quantity of rain and snow, which falls every year. The winter seldom breaks up on the mountains before the 25th of March. A fall of snow was once perceived upon it, which measured an inch and an half on the 11th day of June. The trees which grow upon it are small, and Indian corn is with

* “Mem. Par. 1777, p. 146.”

difficulty brought to maturity even at the foot of the east side of it. The south-west winds on the west side of the mountain are accompanied by cold and rain. The soil is rich, consisting of near a foot in many places of black mould. The roads in this country are muddy in winter, but seldom dusty in summer. The arrangement of strata of the earth on the west side, differs materially from their arrangement on the east side the mountain. "The country, (says Mr. Rittenhouse in a letter to a friend in Philadelphia*) when viewed from the western ridge of the Allegany appears to be one vast, extended plain. All the various strata of stone seem to lie undisturbed in the situation in which they were first formed, and the layers of stone, sand, clay, and coal, are nearly *horizontal*."

The temperature of the air on the west is seldom so hot, or so cold, as on the east side of the mountain. By comparing the state of a thermometer examined by Dr. Bedford at Pittsburg, 284 miles from Philadelphia, it appears that the weather was not so cold by twelve degrees in

* Columbian Magazine for October 1786.

that town, as it was in Philadelphia, on the 5th of February 1788.

To shew the difference between the weather at Spring-Mill and in Pittsburg, I shall here subjoin an account of it, in both places, the first taken by Mr. Legeaux, and the other by Doctor Bedford,

METEOROLOGICAL OBSERVATIONS, made at SPRING-MILL, 13 miles NNW of Philadelphia. Month of April, 1788.

THERMOMETER.

| D. of the month. | of <i>Fahrenheit,</i> mean degree | de <i>Reaumur,</i> degrés moyens |
|------------------|---|--|
| | D. $\frac{1}{\pi}$ O | D. $\frac{1}{\sigma}$ O |

BAROMETER.

| mean height |
|-----------------------------|
| in. pts. $\frac{1}{\sigma}$ |

WIND.
PREVAILING

| DAYS | of aur. boreal. | of rain. | of thunder. | of snow. | of tempest. |
|------|-----------------|----------|-------------|----------|-------------|
| | | | | | |

WATER.

| of RAIN and snow, |
|-----------------------------|
| in. pts. $\frac{1}{\sigma}$ |

WEATHER.

| | | | | | | | | | | | | |
|----|----|---|----|----|---|-------------|---|--|--|--|----|------------------------|
| 1 | 58 | 1 | 29 | 10 | 5 | W | | | | | | Overcast, fair. |
| 2 | 46 | 9 | 30 | 1 | | Calm. | | | | | | Overcast and windy. |
| 3 | 40 | 3 | 30 | | 3 | Changeable. | 1 | | | | 15 | Overcast, rainy. |
| 4 | 51 | 3 | 29 | 11 | 7 | SW | | | | | | Overcast. |
| 5 | 51 | 1 | 30 | | 7 | E | | | | | | Overcast, fair. |
| 6 | 55 | 7 | 29 | 11 | 7 | Calm. | 1 | | | | 3 | Overcast, rainy. |
| 7 | 51 | 3 | 30 | 2 | | NE | 1 | | | | 7 | Overcast, rainy. |
| 8 | 42 | 1 | 29 | 11 | | E | 1 | | | | 4 | Rainy |
| 9 | 63 | 5 | 29 | 8 | | W | | | | | | Overcast, windy. |
| 10 | 46 | 7 | 29 | 10 | | W | | | | | | Fair. |
| 11 | 53 | 8 | 30 | 2 | | W | | | | | | Very fair. |
| 12 | 44 | 5 | 29 | 10 | | Calm. | 1 | | | | 11 | Overcast, rainy. |
| 13 | 60 | 5 | 29 | 10 | | SW | | | | | | Very fair. |
| 14 | 50 | 2 | 29 | 9 | 3 | E | 1 | | | | 14 | Fair, overcast, rainy. |
| 15 | 58 | 1 | 29 | 9 | 7 | SW | 1 | | | | 13 | hazy, rainy. |

METEOROLOGICAL OBSERVATIONS, made at PITTSBURG, 28 1/2 Miles West of Philadelphia. Month of April, 1788.

| | | | | | | | | | | | | |
|----|----|--|--|--|--|--------|---|--|--|--|--|--------------------|
| 1 | 46 | | | | | SW | 1 | | | | | Cloudy. |
| 2 | 42 | | | | | NE b N | | | | | | Clear. |
| 3 | 43 | | | | | SE | 1 | | | | | Cloudy. |
| 4 | 64 | | | | | Calm. | | | | | | Clear. |
| 5 | 80 | | | | | SE b S | 1 | | | | | Cloudy. |
| 6 | 52 | | | | | SW | | | | | | Cloudy. |
| 7 | 48 | | | | | NE b N | | | | | | Cloudy. |
| 8 | 66 | | | | | SE b S | 1 | | | | | Cloudy. |
| 9 | 56 | | | | | NW b N | | | | | | Cloudy. |
| 10 | 60 | | | | | SW | | | | | | Cloudy, with wind. |
| 11 | 62 | | | | | Calm | | | | | | Clear. |
| 12 | 67 | | | | | SW | | | | | | Cloudy, with wind. |
| 13 | 62 | | | | | Calm. | | | | | | Clear. |

From a review of all the facts which have been mentioned, it appears that the climate of Pennsylvania is a compound of most of the climates in the world. Here we have the moisture of Britain in the spring, the heat of Africa in summer, the temperature of Italy in June, the sky of Egypt in the autumn, the cold and snows of Norway and the ice of Holland in the winter, the tempests (in a certain degree) of the West-Indies in every season, and the variable winds and weather of Great-Britain in every month of the year.

From this history of the climate of Pennsylvania, it is easy to ascertain what degrees of health, and what diseases prevail in the state. As we have the climates, so we have the health, and the acute diseases, of all the countries that have been mentioned. Without attempting to enumerate the diseases, I shall only add a few words upon the *time* and *manner* in which they are produced.

I. It appears from the testimonies of many aged persons, that pleurifies and inflammatory disorders of all kinds, are less frequent now than they were forty or fifty years ago.

II. It is a well known fact, that intermitting and bilious fevers have increased in Pennsylvania in proportion

proportion as the country has been *cleared of its wood*, in many parts of the state.

III. It is equally certain that these fevers have lessened, or disappeared, in proportion as the country has been *cultivated*.

IV. Heavy rains and freshes in the spring seldom produce fevers, unless they are succeeded by unseasonably warm weather.

V. Heavy rains or frost, in the autumn, alike check the progress of bilious fevers in Pennsylvania.

VI. The same state of the atmosphere, whether cold or warm, moist or dry, continued for a long time without any material changes, is always healthy. Acute and inflammatory fevers were in vain looked for in the cold winter of 1779-80. The dry summer of 1782, and the wet summer of 1788, were likewise uncommonly healthy in the city of Philadelphia. These facts extend only to those diseases which depend upon the sensible qualities of the air. Diseases from miasmata and contagion, are less influenced by the uniformity of the weather. The autumn of 1780 was very sickly in Philadelphia, from the peculiar situation of the grounds

grounds in the neighbourhood of the city, while the country was uncommonly healthy. The dry summer and autumn of 1782 were uncommonly sickly in the country, from the extensive sources of morbid exhalations which were left by the diminution of the waters in the creeks and rivers. The city of Philadelphia owed its peculiar healthiness during these two seasons, to its being nearly surrounded by tide water.

VII. Diseases are often *generated* in one season and *produced* in another. Hence we frequently observe fevers of different kinds to *follow* every species of the weather that was mentioned in the last observation.

VIII. The fevers which accompany, or follow a warm summer, are bilious and remitting. In proportion as the cool weather advances, they put on the type of Doctor Cullen's typhus mitior. After a very cold winter, I have twice seen pleurifies in the spring, accompanied by the symptoms of the bilious fever. In one of those epidemics, the pulse, on the fifth day, in several cases, became irregular, and stopped after every third or fourth stroke. This complication of typhus with pneumonia, is not peculiar to Pennsylvania. I have been informed that fevers of even a putrid kind frequently
succeed

succeed long and cold winters in Russia and Sweden. They have been ascribed, by a Russian physician, to extreme cold producing the same sedative effects as extreme heat, upon the human body.

IX. The excessive heat in Pennsylvania has sometimes proved fatal to persons who have been much exposed to it. Its morbid effects discover themselves by a difficulty of breathing, a general languor, and in some instances, by a numbness and an immobility of the extremities. The excessive cold in Pennsylvania has more frequently proved fatal, but it has been chiefly to those persons who have sought a defence from it, by large draughts of spirituous liquors. Its operation in bringing on sleepiness previous to death, is well known. On the 5th of February 1782, many people were affected by the cold. It produced a violent pain in the head; and in one instance, a sickness at the stomach, and a vomiting appeared to be the consequence of it. I have frequently observed that a greater number of old people die, during the continuance of extreme cold, and warm weather, than in the same number of days, in moderate weather.

X. May and June are usually the healthiest months in the year.

XI. The

XI. The influence of the winds upon health, depends very much upon the nature of the country over which they pass. Winds which pass over mill-dams and marshes in August and September, generally carry with them the seeds of fevers.

XII. The country in the neighbourhood of Philadelphia is much more sickly than the central parts of the city, after the 20th of August.

XIII. The night-air is always unwholesome from the 20th of August, especially during the passive state of the system in *sleep*. The frequent and sudden changes of the air from heat to cold, (exclusive of its sensible qualities) render it unsafe at any time to sleep with open windows.

XIV. Philadelphia became unusually sickly after the year 1778, during the late war, in consequence of the meadows being overflowed to the southward of the city, and of the cutting down of the trees by the British army, which formerly sheltered the city from the exhalations of the grounds to the north and north-west. From the repairs of the banks of the meadows, which exclude tides and freshes; from the cultivation of the grounds to the westward of the city, which were formerly covered with filth, or with stagnating waters; and lastly,
from

from the more regular cleaning of the streets, and the enclosure of a large and offensive dock which crossed two of the principal streets near the centre of the city, Philadelphia, from having been formerly the most sickly, has become one of the healthiest cities in the United States.

XV. Valetudinarians always enjoy the most health in Pennsylvania in the summer and winter months. The spring, in a particular manner, is very unfavourable to them.

I shall conclude the account of the influence of the climate of Pennsylvania upon the human body, with the following observations.

1. The sensations of heat and cold are influenced so much by outward circumstances, that we often mistake the degrees of them, by neglecting to use such conveniences as are calculated to obviate the effects of their excess. A native of Jamaica often complains less of the heat, and a native of Canada of the cold, in their respective countries, than they do under certain circumstances in Pennsylvania. Even a Pennsylvanian frequently complains less of the heat in Jamaica, and of the cold in Canada, than in his native state. The reason of this

is plain. In countries where heat and cold are intense and regular, the inhabitants guard themselves by accommodating their houses and dresses to each of them. The instability and short duration of excessive heat and cold in Pennsylvania, have unfortunately led its inhabitants, in many instances, to neglect adopting customs, which are used in hot and cold countries to guard against them. Where houses are built with a southern or south-western front exposure, and where other accommodations to the climate are observed in their construction, the disagreeable excesses of heat and cold are rendered much less perceptible in Pennsylvania. Perhaps the application of the principles of Philosophy and taste to the construction of our houses within the last thirty or forty years, may be another reason why some old people have supposed that the degrees of heat and cold are less in Pennsylvania than they were in former years.

2. The number, height, and vegetable productions of the mountains in Pennsylvania, afford a favourable prognosis of the future healthiness of the state. Exclusive of the beneficial effects of these mountains in producing salutary winds, and gentle rains, they will serve as a perpetual and inexhaustible

exhaustible store-house of that pure species of air, which has of late been proved to constitute the vital part of common air.

3. The variable nature of the climate of Pennsylvania does not render it *necessarily* unhealthy. Doctor Huxham has taught us, that the healthiest seasons in Great-Britain have often been accompanied by the most variable weather. His words upon this subject convey a reason for the fact. “When the constitutions of the year are frequently changing, so that by the *contrast* a sort of “*equilibrium* is kept up, and health with it; and “that especially if persons are careful to guard “themselves well against these sudden changes*.” Perhaps no climate or country is unhealthy, where men acquire from experience, or tradition, the arts of accommodating themselves to it. The history of all the nations in the world, whether savage, barbarous, or civilized, previously to a mixture of their manners by an intercourse with strangers, seems to favour this opinion. The climate of China appears, in many particulars, to resemble that of Pennsylvania. The Chinese wear loose garments of different lengths, and increase or diminish the number of them, according to the frequent

* Observations on the Air and Epidemic Diseases, vol. I. p. 5.

and sudden changes of their weather ; hence they have very few acute diseases amongst them. Those inhabitants of Pennsylvania who have acquired the arts of conforming to the changes and extremes of our weather in dress, diet, and manners, escape most of those acute diseases which are occasioned by the sensible qualities of the air ; and faithful inquiries and observations have proved, that they attain to as great ages as the same number of people in any part of the world.

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O F T H E

Bilious Remitting Fever,

AS IT APPEARED IN PHILADELPAIA IN THE SUMMER AND AUTUMN OF THE YEAR 1780.

BEFORE I proceed to describe this fever, it will be necessary to give a short account of the weather, and of the diseases which preceded it.

The spring of 1780 was dry and cool. A catarrh appeared among children between one year and seven years of age. It was accompanied by a defluxion from the eyes and nose, and by a cough and dyspnœa, resembling, in some instances, the cynanche trachealis, and in others a peripneumony. In some cases it was complicated with the symp-

toms of a bilious remitting, and intermitting fever. The exacerbations of this fever were always attended by dyspnœa and cough. A few patients expectorated blood. Some had swellings behind their ears, and others were affected with small ulcers in the throat. I met with only one case of this fever in which the pulse indicated bleeding. The rest yielded in a few days to emetics, blisters, and the bark, assisted by the usual more simple remedies in such disorders.

An intermittent prevailed among adults in the month of May.

July and August were uncommonly warm. The mercury stood on the 6th of August at $94\frac{1}{2}^{\circ}$, on the 15th of the same month at 95° , and for several days afterwards at 90° . Many labouring people perished during this month by the heat, and by drinking, not only cold water, but cold liquors of several kinds, while they were under the violent impressions of the heat.

The vomiting and purging prevailed universally, during these two warm months, among the children, and with uncommon degrees of mortality. Children from one year to eight and nine years old were likewise very generally affected by blotches
and

and little boils, especially in their faces. An eruption on the skin, called by the common people the prickly heat, was very common at this time among persons of all ages. The winds during these months blew chiefly from the south, and south-west. Of course they passed over the land which lies between the city, and the conflux of the rivers Delaware and Schuylkill, the peculiar situation of which, at that time, has been already described.

The dock, and the streets of Philadelphia, supplied the winds at this season, likewise, with a portion of their unwholesome exhalations*.

The remitting fever made its first appearance in July and August, but its symptoms were so mild, and its extent so confined, that it excited no apprehensions of its subsequent more general prevalence throughout the city.

On the 19th of August the air became suddenly very cool. Many hundred people in the city complained, the next day, of different degrees of indisposition, from a sense of lassitude, to a fever of

* The muschetoës were uncommonly numerous during the autumn. A certain sign (says Dr. Lind) of an unwholesome atmosphere.

the remitting type. This was the signal of the epidemic. The weather continued cool during the remaining part of the month, and during the whole month of September. From the exposure of the district of Southwark (which is often distinguished by the name of the *Hill*) to the south-west winds, the fever made its first appearance in that appendage of the city. Scarcely a family, and in many families scarcely a member of them, escaped it. From the Hill it gradually travelled along the Second-street from the Delaware, improperly called Front-street. For a while it was confined to this street only, after it entered the city, and hence it was called by some people the *Front-street fever*. It gradually spread through other parts of the city, but with very different degrees of violence. It prevailed but little in the Northern Liberties. It was scarcely known beyond Fourth-street from the Delaware. Intemperance in eating or drinking, riding in the sun or rain, watching, fatigue, or even a fright, but more frequently cold, all served to excite the seeds of this fever into action, wherever they existed.

All ages and both sexes were affected by this fever. Seven of the practitioners of physic were confined by it nearly at the same time. The city, during the prevalence of the fever, was filled with

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an unusual number of strangers, many of whom, particularly of the Friends (whose yearly meeting was held in the month of September) were affected by it. No other febrile disease was observed during this time in the city.

This fever generally came on with rigor, but seldom with a regular chilly fit, and often without any sensation of cold. In some persons it was introduced by a slight sore throat, and in others, by a hoarseness which was mistaken for a common cold. A giddiness in the head was the forerunner of the disease in some people. This giddiness attacked so suddenly, as to produce, in several instances, a faintness, and even symptoms of apoplexy. It was remarkable that all those persons who were affected in this violent manner, recovered in two or three days.

I met with one instance of this fever attacking with coma, and another with convulsions, and with many instances in which it was introduced by a delirium.

The pains which accompanied this fever were exquisitely severe in the head, back, and limbs. The pains in the head were sometimes in the back parts of it, and at other times they occupied only

the eyeballs. In some people, the pains were so acute in their backs and hips, that they could not lie in bed. In others, the pains affected the neck and arms, so as to produce in one instance a difficulty of moving the fingers of the right hand. They all complained more or less of a soreness in the seats of these pains, particularly when they occupied the head and eyeballs. A few complained of their flesh being sore to the touch, in every part of the body. From these circumstances, the disease was sometimes believed to be a rheumatism; but its more general name among all classes of people was, the *Break-bone fever*.

I met with one case of pain in the back, and another of an acute ear-ach, both of which returned periodically every night, and without any fever.

A nausea universally, and in some instances a vomiting, accompanied by a disagreeable taste in the mouth, attended this fever. The bowels were, in most cases, regular, except where the disease fell with its whole force upon them, producing a symptomatic dysentery*.

* A symptomatic dysentery frequently accompanies the autumnal fevers in Pennsylvania. In the hilly parts of the state, it has been remarked that it prevails chiefly on the *high* grounds;

The tongue was generally moist, and tinged of a yellow colour.

The urine was high coloured, and in its usual quantity in fevers.

The skin was generally moist, especially where the disease terminated on the third or fourth day.

The pulse was quick and full, but never hard, in a single patient that came under my care, till the 28th of September.

It was remarkable, that little, and in some instances, no thirst attended this fever.

A screatus, or constant hawking and spitting, attended in many cases through the whole disease, and was a favourable symptom.

There were generally remissions in this fever every morning, and sometimes in the evening. The exacerbations were more severe every other day, and two exacerbations were often observed in one day.

grounds; while the remitting or intermitting fevers prevail in the neighbourhood *below* them.

A rash

A rash often appeared on the third and fourth days, which proved favourable. This rash was accompanied in some cases by a burning in the palms of the hands and soles of the feet. Many people at this time, who were not confined to their beds, and some, who had no fever, had an efflorescence on their skins.

In several persons the force of the disease seemed to fall upon the face, producing swellings under the jaw and in the ears, which in some instances terminated in abscesses.

When the fever did not terminate on the third or fourth day, it frequently ran on to the eleventh, fourteenth, and even twentieth days, assuming in its progress, according to its duration, the usual symptoms of the typhus gravior, or mitior, of Doctor Cullen. In some cases, the discharge of a few spoons-full of blood from the nose accompanied a solution of the fever on the third or fourth day; while in others, a profuse hæmorrhage from the nose, mouth, and bowels, on the tenth and eleventh days, preceded a fatal issue of the disease.

Several cases came under my care, in which the fever was succeeded by a jaundice.

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The disease terminated in some cases without sweating, or a sediment in the urine; nor did I find such patients more disposed to relapse than others, provided they took a sufficient quantity of the bark.

About the beginning of October the weather became cool, accompanied by rain and an easterly wind. This cool and wet weather continued for four days. The mercury in the thermometer fell to 60° , and fires became agreeable. From this time the fever evidently declined, or was accompanied by inflammatory symptoms. On the 16th of October, I met with a case of inflammatory angina; and on the next day I visited a patient who had a complication of the bilious fever with a pleurisy, and whose blood discovered strong marks of the presence of the inflammatory diathesis. His stools were of a green and black color. On the third day of his disorder the rash appeared on his skin, and on the fourth, in consequence of a second bleeding, his fever terminated with the common symptoms of a crisis.

During the latter end of October, and the first weeks in November, the mercury in the Thermometer fluctuated between 50° and 60° . Pleurific

rifies and inflammatory diseases of all kinds now made their appearance. They were more numerous and more acute, than in this stage of the autumn, in former years. I met with one case of pleurisy in November, which did not yield to less than four plentiful bleedings.

I shall now add a short account of the METHOD I pursued in the treatment of this fever.

I generally began by giving a gentle vomit of tartar emetic. This medicine, if given while the fever was in its forming state, frequently produced an immediate cure; and if given after its formation, on the *first* day, seldom failed of producing a crisis on the third or fourth day. The vomit always discharged more or less bile. If a nausea, or an ineffectual attempt to vomit continued after the exhibition of the tartar emetic, I gave a second dose of it with the happiest effects.

If the vomit failed of opening the bowels, I gave gentle doses of salts and cream of tartar*,

* I have always found that cream of tartar renders the purging neutral salts less disagreeable to the taste and stomach; but accident has lately taught me, that the juice of two limes or of one lemon, with about half an ounce of loaf sugar added to six drachms of Glauber or Epsom salt,

in

or of the butter-nut pill*, so as to procure two or three plentiful stools. The matter discharged from the bowels was of a highly bilious nature. It was sometimes so acrid as to excoriate the rectum, and so offensive, as to occasion, in some cases, sickness and faintness both in the patients and in their attendants. In every instance the patients found relief by these evacuations, especially from the pains in the head and limbs.

In those cases, where the prejudices of the patients against an emetic, or where an advanced state of pregnancy, or an habitual predisposition to hæmatemesis occurred, I discharged the bile entirely by means of the lenient purges that have been mentioned. In this practice I had the example of Doctor Cleghorn, who prescribed purges with great success in a fever of the same species in Minorca, with that which has been described†. Doctor Lining prescribed purges with equal success in an autumnal pleurisy in South Carolina,

in half a pint of boiling water, form a mixture that is nearly as pleasant as strong beverage.

* This pill is made from an extract of a strong decoction of the inner bark of the white walnut-tree.

† The tertiana interposita remissione tantum, of Dr. Culler.

which

which I take to be a species of a bilious remittent, accompanied by an inflammatory affection of the breast.

After evacuating the contents of the stomach and bowels, I gave small doses of tartar emetic, mixed with Glauber's salt. This medicine excited a general perspiration. It likewise kept the bowels gently open, by which means the bile was discharged as fast as it was accumulated.

I constantly recommended to my patients, in this stage of the disorder, to *lie in bed*. This favoured the eruption of the rash, and the solution of the disease by perspiration. Persons who struggled against the fever by *sitting up*, or who attempted to shake it off by labour or exercise, either sunk under it, or had a slow recovery.

A clergyman of a respectable character from the country, who was attacked by the disease in the city, returned home, from a desire of being attended by his own family, and died in a few days afterwards. This is only one, of many cases, in which I have observed travelling, even in the easiest carriages, to prove fatal in fevers after they were formed, or after the first symptoms had shewn themselves. The quickest and most effectual

tual way of conquering a fever, in most cases, is, by an early submission to it.

The drinks I recommended to my patients were sage and baum teas, apple* and tamarind water, weak punch, lemonade, and wine whey.

I found obvious advantages in many cases, from the use of pediluvia, every night.

In every case, I found the patients refreshed and relieved by frequent changes of their linen.

On the third or fourth day, in the forenoon, the pains in the head and back generally abated, with a sweat which was diffused over the whole body. The pulse at this time remained quick and weak. This was, however, no objection to the use of the bark, a few doses of which immediately abated its quickness, and prevented a return of the fever.

If the fever continued beyond the third or fourth day without an intermission, I always had recourse

* That apple-water is most agreeable which is made by pouring boiling water upon slices of raw apples. It is more lively than that which is made by pouring the water on roasted apples.

to blisters. Those which were applied to the neck, and behind the ears produced the most immediate good effects. They seldom failed of producing an intermission in the fever, the day after they were applied. Where delirium or coma attended, I applied the blister to the neck on the *first* day of the disorder. A worthy family in this city will always ascribe the life of a promising boy of ten years old, to the early application of a blister to the neck, in this fever.

Where the fever did not yield to blisters, and assumed the symptoms of typhus gravior or nitior, I gave the medicines usually exhibited in both the species of that fever.

I took notice in the history of this fever, that it was sometimes accompanied by the symptoms of a dysentery. Where this disorder appeared, I prescribed lenient purges and opiates. Where these failed of success, I gave the bark in the intermissions of the pain in the bowels, and applied blisters to the wrists. The good effects of these remedies led me to conclude, that the dysentery was the febris introversa of Dr. Sydenham.

I am happy in having an opportunity, in this place, of bearing a testimony in favour of the usefulness

fulness of OPIUM in this disorder, after the necessary evacuations had been made. I yielded, in prescribing it at first, to the earnest solicitations of my patients for something to give them relief from their insupportable pains, particularly when they were seated in the eye-balls and head. Its salutary effects in procuring sweat, and a remission of the fever, led me to prescribe it afterwards in almost every case and always with the happiest effects. Those physicians enjoy but little pleasure in practising physic, who know not how much of the pain and anguish of fevers, of a certain kind, may be lessened by the judicious use of opium.

In treating of the remedies used in this disorder, I have taken no notice of blood-letting. Out of several hundred patients whom I visited in this fever, I did not meet with a single case, before the 27th of September, in which the state of the pulse indicated this evacuation. It is true, the pulse was *full*, but never *hard*. I acknowledge that I was called to several patients who had been bled without the advice of a physician, who recovered afterwards on the usual days of the solution of the fever. This only can be ascribed to that disposition which Doctor Cleghorn attributes to fevers, to preserve their types under every variety

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of treatment, as well as constitution. But I am bound to declare further, that I heard of several cases in which bleeding was followed by a fatal termination of the disease.

In this fever relapses were very frequent, from exposure to the rain, sun, or night air, and from an excess in eating or drinking.

The convalescence from this disease was marked by a number of extraordinary symptoms, which rendered patients the subjects of medical attention for many days after the pulse became perfectly regular, and after the crisis of the disease.

A bitter taste in the mouth, accompanied by a yellow colour on the tongue continued for near a week.

Most of those who recovered complained of nausea and a total want of appetite. A faintness, especially upon sitting up in bed, or in a chair, followed this fever. A weakness in the knees was universal. I met with two patients, who were most sensible of this weakness in the right knee. An inflammation in one eye, and in some instances in both eyes, occurred in several patients after their recovery.

But

But the most remarkable symptom of the convalescence from this fever, was an uncommon dejection of the spirits. I attended two young ladies who shed tears while they vented their complaints of their sickness and weakness. One of them very aptly proposed to me to change the name of the disorder, and to call it in its present stage, instead of the Break-bone, the *Break-heart fever*.

To remove these symptoms, I gave the tincture of bark and elixir of vitriol in frequent doses. I likewise recommended the plentiful use of ripe fruits; but I saw the best effects from temperate meals of oysters, and a liberal use of porter. To these was added, gentle exercise in the open air, which gradually completed the cure.

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O F T H E

Scarlatina Anginosa.

AS IT APPEARED IN PHILADELPHIA, IN THE
YEARS 1783 AND 1784.

THE beginning of the month of July was unusually cool; infomuch that the mercury in Farenheit's thermometer stood at 61° in the day time, and fires were very comfortable, especially in the evening. In the last week but one, of this month, the weather suddenly became so warm, that the mercury rose to $94\frac{1}{2}^{\circ}$, at which it remained for three days. As this heat was accompanied by no breeze from any quarter, the sense of it was extremely distressing to many people. Upwards of twenty persons died in the course of these three days, from the excess of the heat, and
from

from drinking cold water. Three old people died suddenly within this space of time. This extreme heat was succeeded by cool weather, the mercury having fallen to 60° , and the month closed with producing a few intermitting and remitting fevers, together with several cases of inflammatory angina.

The weather in the month of August was extremely variable. The mercury, after standing for several days at 92° , suddenly fell so low, as not only to render fires necessary, but in many places to produce frost.

Every genus of fever made its appearance in this month. The synocha was so acute, in several cases, as to require from three to four bleedings. The remitting fever was accompanied by an uncommon degree of nausea and faintness. Several people died, after a few days illness, of the typhus gravior, of Dr. Cullen. The intermittents had nothing peculiar in them, either as to their symptoms or method of cure.

Towards the close of the month, the scarlatina anginosa made its appearance, chiefly among children.

The month of September was cool and dry, and the scarlatina anginosa became epidemic among adults as well as young people. In most of the patients who were affected by it, it came on with a chillness and a sickness at the stomach, or a vomiting; which last was so invariably present, that it was with me a pathognomonic sign of the disease. The matter discharged from the stomach was always bile. The swelling of the throat was, in some instances so great, as to produce a difficulty of speaking, swallowing, and breathing. In a few instances, the speech was accompanied by a squeaking voice, resembling that which attends the cynanche trachealis. The ulcers on the tonsils were deep, and covered with white, and in some instances, with black sloughs. In several cases there was a discharge of a thick mucus from the nose, from the beginning, but it often occurred in the decline of the disease, which most frequently happened on the fifth day. Sometimes the subsiding of the swelling of the throat was followed by a swelling behind the ears.

An eruption on the skin generally attended the symptoms which have been described. But this symptom appeared with considerable variety. In some people it preceded, and in others followed the ulcers and swelling of the throat. In some, it

appeared only on the outside of the throat and on the breast; in others, it appeared chiefly on the limbs. In a few it appeared on the second or third day of the disorder, and never returned afterwards. I saw two cases of eruption without a single symptom of sore throat. The face of one of those patients was swelled, as in the erysipelas. In the other, a young girl of seven years old, there was only a slight redness on the skin. She was seized with a vomiting, and died delirious in fifty-four hours. Soon after her death, a livid colour appeared on the outside of her throat.

The bowels, in this degree of the disorder, were in general regular. I can recollect but few cases which were attended by a diarrhœa.

The fever which accompanied the disorder was generally the typhus mitior of Doctor Cullen. In a few cases it assumed the symptoms of the typhus gravior.

The disease frequently went off with a swelling of the hands and feet. I saw one instance in a gentlewoman, in whom this swelling was absent, who complained of very acute pains in her limbs, resembling those of the rheumatism.

In two cases which terminated fatally, there were large abscesses; the one on the outside, and the other on the inside of the throat. The first of these cases was accompanied by troublesome sores on the ends of the fingers. One of these patients lived twenty-eight, and the other above thirty days, and both appeared to die from the discharge which followed the opening of their abscesses.

Between the degrees of the disease which I have described, there were many intermediate degrees of indisposition which belonged to this disorder.

I saw in several cases a discharge from behind the ears, and from the nose, with a slight eruption, and no sore throat. All these patients were able to sit up and walk about.

I saw one instance of a discharge from the inside of one of the ears in a child, who had ulcers in his throat, and the squeaking voice.

In some, a pain in the jaw, with swellings behind the ears and a slight fever, constituted the whole of the disease.

In

In one case, the disease came on with a coma, and in several patients it went off with this symptom.

A few instances occurred of adults, who walked about, and even transacted business until a few hours before they died.

The intermitting fever, which made its appearance in August, was not lost during the month of September. It continued to prevail, but with several peculiar symptoms. In many persons it was accompanied by an eruption on the skin, and a swelling of the hands and feet. In some, it was attended by a sore throat and pains behind the ears. Indeed, such was the prevalence of the contagion which produced the scarlatina anginosa, that many hundred people complained of sore throats without any other symptom of indisposition. The slightest occasional or exciting cause, and particularly cold, seldom failed of producing the disorder.

The month of October was much cooler than September, and the disease continued, but with less alarming symptoms. In several adults, who were seized with it, the hardness of the pulse indicated blood-

blood-letting. The blood, in one case, was covered with a buffy coat, but beneath its surface it was dissolved.

In the month of November the disease assumed several inflammatory symptoms, and was attended with much less danger than formerly. I visited one patient whose symptoms were so inflammatory as to require two bleedings. During the decline of the disease, many people complained of troublesome sores on the ends of their fingers. A number of children likewise had sore throats and fevers, with eruptions on their skins, which resembled the chicken-pox. I am disposed to suspect that this eruption was the effect of the contagion of the scarlatina anginosa, as several instances occurred of patients who had all the symptoms of this disease, in whom an eruption of white blisters succeeded their recovery. This form of the disease has been called by Sauvage, the scarlatina variolosa.

I saw one case of sore throat, which was succeeded not only by swellings in the abdomen and limbs, but by a catarrh, which brought on a fatal consumption.

A considerable shock of an earthquake was felt on the 29th of this month, at ten o'clock at night,
in

in the city of Philadelphia ; but no change was perceived in the disease, in consequence of it.

In December, January, and February, the weather was intensely cold. There was a thaw for a few days in January, which broke the ice of the Delaware, but it was followed by cold so excessive as to close the river till the beginning of March. The mercury on the 28 and 29th of February, stood below 0 in Fahrenheit's thermometer.

For a few weeks in the beginning of December the disease disappeared in the circle of my patients, but it broke out with great violence the latter end of that month, and in the January following. Some of the worst cases that I met with, (three of which proved fatal) were in those two months.

The disease disappeared in the spring, but it spread afterwards through the neighbouring states of New-Jersey, Delaware and Maryland.

I shall now add an account of the remedies which I administered in this disorder.

In every case that I was called to, I began the cure by giving a vomit joined with calomel. The vomit was either tartar emetic or ipecacuanha, according to the prejudices, habits, or constitutions
of

of my patients. A quantity of bile was generally discharged by this medicine. Besides evacuating the contents of the stomach, it cleansed the throat in its passage downwards. To ensure this effect from the calomel, I always directed it to be given mixed with syrup or sugar and water, so as to diffuse it generally over every part of the throat. The calomel seldom failed to produce two or three stools. In several cases I was obliged, by the continuance of nausea, to repeat the emetics, and always with immediate and obvious advantage. I gave the calomel in moderate doses in every stage of the disorder. To restrain its purgative effects, when necessary, I added to it a small quantity of opium.

During the whole course of the disorder, where the calomel failed of opening the bowels, I gave lenient purges, when a disposition to costiveness required them.

The throat was kept clean by detergent gargles. In several instances I saw evident advantages from adding a few grains of calomel to them. In cases of great difficulty of swallowing or breathing, the patients found relief from receiving the steams of warm water mixed with a little vinegar, through a funnel into the throat.

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A perspiration kept up by gentle doses of antimonials, and diluting drinks, impregnated with wine, always gave relief.

In every case which did not yield to the above remedies on the third day, I applied a blister behind each ear, or one to the neck, and I think, always with good effects.

I met with no cases in which the bark appeared to be indicated as an antiseptic, except the three in which the disease proved fatal. Where the fore throat was blended with the intermitting fever, the bark was given with advantage. But in common cases it was unnecessary. Subsequent observations have led me to believe, with Doctor Withering, that it is sometimes hurtful in this disorder.

This disease proved fatal in many parts of the country, upon its first appearance; but wherever the mode of treatment here delivered was adopted, its mortality was soon checked. The calomel was used very generally in New-Jersey and New-York. In the Delaware state, a physician of character made it a practice not only to give calomel, but to anoint the outside of the throat with mercurial ointment.

ADDITIONAL.

ADDITIONAL OBSERVATIONS

UPON THE

Scarlatina Anginosa.

THIS disease has prevailed in Philadelphia, at different seasons, ever since the year 1783. It has blended itself occasionally with all our epidemics. Many cases have come under my notice since its first appearance, in which dropical swellings have succeeded the fever. In some instances there appeared to be effusions of water not only in the limbs and abdomen, but in the thorax. They yielded, in every case that I attended, to purges of calomel and jalap. Where these swellings were neglected, they sometimes proved fatal.

In the winter of 1786-7, the scarlatina anginosa was blended with the cynanche parotidea, and in one instance with a typhus mitior. The

last was in a young girl of nine years of age. She was seized with a vomiting of bile and an efflorescence on her breast, but discovered no other symptoms of the scarlatina anginosa till the sixteenth day of her fever, when a swelling appeared on the outside of her throat; and after her recovery, a pain and swelling in one of her knees.

In the month of July 1787, a number of people were affected by sudden swellings of their lips and eyelids. These swellings generally came on in the night, were attended with little or no pain, and went off in two or three days. I met with only one case in which there was a different issue to these symptoms. It was in a patient in the Pennsylvania hospital, in whom a swelling in the lips ended in a suppuration, which, notwithstanding the liberal use of bark and wine, proved fatal in the course of twelve days.

In the months of June and July 1788, a number of people were affected by sudden swellings, not only of the lips, but of the cheeks and throat. At the same time many persons were affected by an inflammation of the eyes. The swellings were attended with more pain than they were the year before, and some of them required one or two
purges

purges to remove them; but in general they went without medicine, in two or three days.

Is it proper to refer these complaints to the same contagion which produces the scarlatina anginosa?

The prevalence of the scarlatina anginosa at the *same time* in this city; its disposition to produce swellings in different parts of the body; and the analogy of the intermitting fever, which often conceals itself under symptoms that are foreign to its usual type; all seems to render this conjecture probable. In one of the cases of an inflammation of the eye, which came under my notice, the patient was affected by a vomiting a few hours before the inflammation appeared, and complained of a sickness at his stomach for two or three days afterwards. Now a vomiting and nausea appear to be pathognomonic symptoms of the scarlatina anginosa.

In the autumn of 1788, the scarlatina anginosa appeared with different degrees of violence in many parts of the city. In two instances it appeared with an obstinate diarrhœa; but it was in young subjects, and not in adults, as described by Doctor Withering. In both cases, the disease

proved fatal; the one on the third, the other on the fifth day.

In the month of December of the same year, I saw one case in which a running from one of the ears and a deafness came on, on the fifth day immediately after the discharge of mucus from the nose had ceased. This case terminated favourably on the ninth day, but was succeeded for several days afterwards by a troublesome cough.

I shall conclude this essay by the following remarks :

1. Camphor has often been suspended in a bag from the neck, as a preservative against this disease. Repeated observations have taught me, that it possesses little or no efficacy for this purpose. I have had reason to entertain a more favourable opinion of the benefit of washing the hands and face with vinegar, and of rinsing the mouth and throat with vinegar and water every morning, as means of preventing this disorder.

2. Whenever I have been called to a patient where the scarlatina appeared to be in a *forming* state, a vomit of ipecacuana or tartar emetic, mixed

mixed with a few grains of calomel, has never failed of completely checking the disorder, or of so far mitigating its violence, as to dispose it to a favourable issue in a few days; and if these observations should serve no other purpose than to awaken the early attention of patients and physicians to this speedy and effectual remedy, they will not have been recorded in vain.

3. When the contagion of this disease has been received into the body, a purge has prevented its being excited into action, or rendered the disorder mild, throughout a whole family. For this practice I am indebted to some observations on the Scarlatina, published by Dr Sims in the first volume of the Medical Memoirs.

A N

I N Q U I R Y

I N T O T H E

C A U S E A N D C U R E

O F T H E

Cholera Infantum.

BY this name I mean to designate a disease, called, in Philadelphia, the “vomiting and purging of children.” From the regularity of its appearance in the summer months, it is likewise known by the name of “the disease of the season.” It prevails in most of the large towns in the United States. It is distinguished in Charlestown in South Carolina, by the name of “the April and May disorder,” from making its first appearance in those two months. It seldom appears in Philadelphia till the middle of June, or the beginning of July, and generally continues till near the middle of September. Its frequency

and danger are always in proportion to the heat of the weather. It affects children from the first or second week after their birth, till they are two years old. It sometimes begins with a diarrhœa, which continues for several days without any other symptom of indisposition; but it more frequently comes on with a violent vomiting and purging, and a high fever. The matter discharged from the stomach and bowels is generally yellow or green, but the stools are sometimes slimy and bloody, without any tincture of bile. In some instances they are nearly as limpid as water. Worms are frequently discharged in each kind of the stools that has been described. The children in this stage of the disorder, appear to suffer a good deal of pain. They draw up their feet, and are never easy in one posture. The pulse is quick and weak. The head is unusually warm, while the extremities retain their natural heat, or incline to be cold. The fever is of the remitting kind, and discovers evident exacerbations, especially in the evenings. The disease affects the head so much, as in some instances to produce symptoms not only of delirium, but of mania, insomuch that the children throw their heads backwards and forwards, and sometimes make attempts to scratch, and to bite, their parents or nurses. A swelling frequently occurs in the abdomen, and
in

in the face and limbs. An intense thirst attends every stage of the disorder. The eyes appear languid and hollow, and the children generally sleep with them half closed. Such is the insensibility of the system in some instances in this disorder, that flies have been seen to alight upon the eyes when open, without exciting a motion in the eyelids to remove them. Sometimes the vomiting continues without the purging, but more generally, the purging continues without the vomiting, through the whole course of the disorder. The stools are frequently large, and extremely foetid, but in some instances they are without smell, and resemble drinks or aliment which has been taken into the body. The disease is sometimes fatal in a few days. I once saw it carry off a child in four and twenty hours. Its duration is varied by the season of the year, and by the changes in the temperature of the weather. A cool day frequently abates its violence, and disposes it to a favourable termination. It often continues with occasional variations in its appearance, for six weeks or two months. Where the disease has been of long continuance, the approach of death is gradual, and attended by a number of distressing symptoms. An emaciation of the body to such a degree, as that the bones come through the skin, livid spots, a sin-

gultus, convulsions, a strongly marked hippocratic countenance, and a fore-mouth, generally precede the fatal termination of this disorder. Few children ever recover, after the last symptoms which have been mentioned make their appearance.

This disease has been ascribed to several causes; of each of which I shall take notice in order.

I. It has been attributed to *dentition*. To refute this opinion, it will be necessary to observe, that it appears only in one season of the year. Dentition, I acknowledge, sometimes aggravates the disorder; hence we find it is most severe in that period of life, when the greatest number of teeth make their appearance, which is generally about the 10th month. I think I have observed more children to die of this disorder at that age, than at any other.

II. Worms have likewise been suspected of being the cause of this disease. To this opinion, I object the uncertainty of worms ever producing an idiopathic fever, and the improbability of their combining in such a manner as to produce an annual epidemic disease of any kind. But further, we often see the disorder in all its force,

before that age, in which worms usually produce diseases; we likewise often see it resist the most powerful anthelmintic medicines; and lastly, it appears from dissection, where the disease has proved fatal, that not a single worm has been discovered in the bowels. It is true, worms are in some instances discharged in this disorder, but they are frequently discharged in greater numbers in the hydrocephalus internus, and in the small-pox, and yet who will assert either of those diseases to be produced by worms.

III. The *summer fruits* have been accused of producing this disorder. To this opinion, I object, that the disease is but little known in country places, where children eat much more fruit than in cities. As far as I have observed, I am disposed to believe that the moderate use of ripe fruits, rather tends to prevent, than to induce the disease.

From the discharge of bile which generally introduces the disease, from the remissions and exacerbations of the fever which accompanies it, and from its occurring nearly in the same season with the cholera and remitting fever in adults, I am disposed to consider it as a modification of the same diseases. Its appearance earlier in the season than the cholera and remitting fever in adults,

adults, must be ascribed to the constitutions of children being more predisposed from weakness to be acted upon, by the remote causes which produce those disorders.

I shall now mention the remedies which are proper and useful in this disorder.

I. The first indication of cure is to evacuate the bile from the stomach and bowels. This should be done by gentle doses of ipecacuanha, or tartar emetic. The vomits should be repeated occasionally, if indicated, in every stage of the disorder. The bowels should be opened by means of manna, castor oil, or magnesia. I have generally found rhubarb improper for this purpose, while the stomach was in a very irritable state. In those cases, where there is reason to believe that the offending contents of the primæ viæ have been discharged by nature, (which is often the case) the emetics and purges should by no means be given; but, instead of them, recourse must be had to

II. Opiates. A few drops of liquid laudanum, combined in a testaceous julep, with pepper-mint or cinnamon-water, seldom fail of composing the stomach and bowels. In some instances, this medicine

dicine alone subdues the disease in two or three days; but where it does not prove so successful, it produces a remission of pain, and of other distressing symptoms, in every stage of the disorder.

III. Demulcent and diluting drinks have an agreeable effect in this disease. Mint and mallow teas, or a tea made of blackberry roots infused in cold water, together with a decoction of the shavings of hartshorn and gum arabic with cinnamon, should all be given in their turns for this purpose.

IV. Glysters made of flaxseed tea, or of mutton broth, or of starch dissolved in water, with a few drops of liquid laudanum in them, give ease, and produce other useful effects.

V. Plasters of Venice treacle applied to the region of the stomach, and flannels dipped in infusions of bitter andromatic herbs in warm spirits, or Madeira wine, and applied to the region of the abdomen, often afford considerable relief.

VI. As soon as the more violent symptoms of the disease are composed, tonic and cordial medicines should be given. The bark in decoction, or in substance, (where it can be retained in that form)

form) mixed with a little nutmeg, often produce the most salutary effects. Port wine or claret mixed with water are likewise proper in this stage of the disorder. After the disease has continued for some time, we often see an appetite suddenly awakened for articles of diet of a stimulating nature. I have seen many children recover from being gratified in an inclination to eat salted fish, or the different kinds of salted meat. In some instances they discover an appetite for butter, and the richest gravies of roasted meats, and eat them with obvious relief to all their symptoms. I once saw a child of sixteen months old, perfectly restored, from the lowest stage of this disorder, by eating large quantities of rancid English cheese, and drinking two or three glasses of Port wine every day. She would in no instance eat bread with the cheese, nor taste the wine, if it was mixed with water.

We sometimes see relief given by the use of the warm bath, in cases of obstinate pain. The bath is more effectual, if warm wine is used, instead of water.

I have had but few opportunities of trying the effects of cold water applied to the body in this disorder; but from the benefit which attended its
use

use in the cases in which it was prescribed, I am disposed to believe that it would do great service, could we overcome the prejudices which subsist in the minds of parents against it.

After all that has been said in favour of the remedies that have been mentioned, I am sorry to add, that I have very often seen them all administered without effect. My principal dependence, therefore, for many years, has been placed upon

VII. Country air. Out of many hundred children whom I have sent into the country in every stage of this disorder, I have lost only three; two of whom were sent, contrary to my advice, into that unhealthy part of the neighbourhood of Philadelphia called the *Neck*, which lies between the city and the conflux of the rivers Delaware and Schuylkill. I have seen one cure performed by this remedy, after convulsions had taken place. To derive the utmost benefit from the country air, children should be carried out on horseback, or in a carriage, every day; and they should be exposed to the open air as much as possible in fair weather in the day time. Where the convenience of the constant benefit of country air cannot be obtained, I have seen evident advantages from taking children out of the city once or twice a day.

day. It is extremely agreeable to see the little sufferers revive as soon as they escape from the city air, and inspire the pure air of the country.

I shall conclude this inquiry, by recommending the following methods of preventing this disorder, all of which have been found by experience to be useful.

1. The daily use of the cold bath.
2. A faithful and attentive accommodation of the dresses of children, to the state and changes of the air.
3. A moderate quantity of salted meat taken occasionally in those months in which this disease usually prevails. It is perhaps in part from the daily use of salted meat in diet that the children of country people escape this disorder.
4. The use of sound old wine in the summer months. From a tea-spoon-full, to half a wine glass full, according to the age of the child, may be given every day. It is remarkable, that the children of persons in easy circumstances, who sip occasionally with their parents the remains of a glass of wine after dinner, are much less subject
to

to this disorder, than the children of poor people, who are without the benefit of that article of diet.

5. Cleanliness both with respect to the skin and cloathing of children. Perhaps the neglect of this direction may be another reason why the children of the poor are most subject to this disorder.

6. The removal of children into the country before the approach of warm weather. This advice is peculiarly necessary during the whole period of dentition. I have never known but one instance of a child being affected by this disorder, who had been carried into the country in order to avoid it.

O B S E R V A T I O N S

ON THE

Cynanche Trachealis.

I TAKE great pleasure in thus publicly acknowledging a mistake, which I committed in my letter to Doctor Millar, published by him in London in the year 1770, in supposing that there was but *one* species of this disorder, and that that was *spasmodic*. I am now satisfied, from repeated observations, that there is another species, which I shall take the liberty of calling the *cynanche trachealis humida*.

I exclude, as a species of this disorder, the *cynanche trachealis maligna*. Many of the symptoms of the *cynanche trachealis* occur in the malignant sore throat, but they should by no means

constitute the name of a species of that disease. I have seen the same symptoms in the scarlatina anginosa, and yet I never thought of ranking a cynanche trachealis scarlatina among the species of that disorder. I have likewise seen the cynanche trachealis in the last stage of the secondary fever of the small-pox, without supposing that it ought to derive a specific name from that disease. The species of diarrhœa would be innumerable, if, every time it occurred as a symptom of other disorders, it was to receive a specific name, and to be considered as an idiopathic disorder.

The reasons which I offered in my letter to Doctor Millar, for believing that the cynanche trachealis is frequently a spasmodic disorder, continue to operate upon me with as much force as ever. But a number of dissections related by different authors, satisfy me, that the cynanche trachealis humida is a distinct species from the spasmodic, and requires a different method of cure.

The cynanche trachealis spasmodica is known,

1. By coming on *suddenly*, and that generally in the night.

2. By frequent and perfect *intermissions* of the symptoms for hours, and in some instances for days,

days, without the least sensible discharge from the trachea. And,

3. By yielding to antispasmodic remedies, particularly to the warm bath.

If these facts had left any reasons to doubt of a spasmodic species of this disorder, I should have been confirmed in the opinion, by the dissection of a child in the year 1770, who died by it, in whom no marks were to be found of a membrane, or even of mucus in the trachea, The lungs and trachea appeared to be in a sound state.

The cynanche trachealis humida is known,

1. By coming on *gradually*, and that most commonly in the day time.

2. By its continuing or increasing for several days without any remarkable remission, or even abatement of the symptoms.

3. By the discharge of phlegm or mucus from the trachea, and the occasional appearance of it in the stools. And,

4. By not yielding to antispasmodic medicines.

On the eighth of December 1790, I examined the lungs and trachea of a child (aged five years) who died of this species of the cynanche trachealis. I found about two tea-spoonfulls of mucus in the trachea. The bronchial vessels seemed to be full of the same kind of liquid. There was no appearance of a membrane in the trachea. Its anterior part was a little inflamed. Blood drawn from this child during its illness, was fizy.

My opinion of the cause of the membrane which is formed in the trachea continues to be the same as expressed in my former publication*, with this

* “ The vessels of the trachea and bronchiæ always
 “ abound with a thin mucus, which is poured into them in
 “ proportion as they are irritated by inflammation, or the
 “ action of the external air. Children abound with a greater
 “ quantity of mucus in these parts than adults; and when
 “ it is accumulated in the trachea or bronchiæ in a greater
 “ quantity than ordinary, they are unable, upon the ac-
 “ count of their weakness, to bring it up. It is easy to
 “ conceive in what manner it is converted into a thin mem-
 “ brane, after its more fluid parts are dissipated. We have
 “ an analogy of this in the nose. Were the passages of
 “ this organ less in our reach, it is probable a membrane
 “ resembling that found in the trachea would be found in
 “ it every four and twenty hours, especially when it was
 “ affected by a cold. We always find the phlegm accumu-
 “ lated in proportion to the time the disorder has conti-
 “ nued.

difference, that I believe the membrane to be the effect of the humid species only, and that it is not an accidental consequence of the spasmodic, as I once supposed. The symptoms of the spasmodic species are described by Dr. Millar, in his observations on the asthma and whooping cough, in the following words: “ Children (says he) at play “ were sometimes seized with it, but it generally “ came on at night. A child who went to bed in “ perfect health, waked an hour or two afterwards “ in a fright, with his face much flushed, or some- “ times of a livid colour; incapable of describing “ what he felt; breathing with much labour, and “ with a convulsive motion in the belly; the re- “ turns of inspiration and expiration quickly suc- “ ceeding each other in that particular sonorous “ manner, which is often observed in hysteric pa- “ roxysms. The child’s terror sometimes aug- “ mented the disorder. He clung to the nurse, “ and if he was not speedily relieved by cough- “ ing, belching, sneezing, vomiting, or purging, “ the suffocation increased, and he died in the pa- “ roxysm.”

“ nued. In all the cases of membrane mentioned by Doc-
 “ tor Home, the patients never died before the *third* day,
 “ and in many cases, not before the fourth and fifth days.”
 Letter to Doctor Millar.

To this description of the cynanche trachealis, I shall add the three following observations :

1. The noise which patients make in coughing in this disorder, resembles the barking of a young dog. This symptom is so universally present, that I always rely upon it as a pathognomonic sign of the disease before it is completely formed. I have observed this barking cough, in one instance of cynanche trachealis humida, to continue for several days after the patient was out of danger.

2. During the continuance of the disease there is frequently an eruption of little red blotches on the skin, which is accompanied by sensible relief to the patient. This eruption sometimes appears and disappears two or three times in the course of the disease.

3. The disease is not confined wholly to children. I have seen two cases of the spasmodic species in adults.

Doctor Cullen has given birth to a controversy respecting the inflammatory nature of the cynanche trachealis. He has included it in the order of phlegmasiæ in his class of pyrexia. I acknowledge that I have generally seen both the species that
have

have been mentioned, without inflammatory symptoms, and sometimes without fever, especially in the first stage of the disorder. When either species have been attended by a hard pulse, it has been only in plethoric habits, or when it has been complicated with symptoms of catarrh or peripneumony.

Perhaps it may appear improper, after such a declaration, to have adopted the name given to this disorder by Doctor Cullen. I should have had no objection to Doctor Michaelis's name of "angina polyposa," did it not exclude the spasmodic species of this disease; nor should I hesitate in adopting the more generic term of "suffocatio stridula" of Doctor Home, if the disease were not now so generally known by the name given it by Doctor Cullen*.

The remedies to be used in cynanche trachealis spasmodica, are, 1. Bleeding, when it is connected with pneumonic symptoms; 2. Vomits; 3. Purges;

* The vulgar name of this disease in Pennsylvania is the *Hives*. It appears to be a corruption of the word "heaves," which took its rise from the manner in which the lungs *heave* in respiration. The worst degrees of the disorder are called the "bowel-hives," from the great motion of the abdominal muscles in respiration.

and, 4. Antispasmodic medicines, more especially the warm bath, opium, assafætida and blisters.

The remedies which are proper in the cynanche trachealis humida, are the three first which are mentioned for the cure of the spasmodic species, and CALOMEL. Our principal dependence must be placed upon this last medicine. A large dose of it should be given as soon as the disease discovers itself, and smaller doses should be given every day, while any of its symptoms continue. The bark is scarcely a more certain remedy for intermittents, than calomel, when thus administered, is in this species of cynanche.

In what manner does the calomel act in this disorder? Is it by *increasing* the secretion of mucus in the numerous glands of the fauces, œsophagus, stomach and bowels, and thereby *lessening* the excretion of it in the trachea? The analogy of the secretions and excretions, in other parts of the body, whether promoted by nature or art, seems to favour this conjecture.

I shall only add upon the subject of this disorder, that instances of its mortality have been very rare in Philadelphia, since the general use of the remedies which have been mentioned.

A N

A C C O U N T

OF THE EFFECTS OF

BLISTERS AND BLEEDING,

IN THE CURE OF OBSTINATE

Intermitting Fevers.

THE efficacy of these remedies will probably be disputed by every regular-bred physician, who has not been a witness of their utility in the above disorder; but it becomes such physicians, before they decide upon this subject, to remember, that many things are true in medicine, as well as in other branches of philosophy, which are very improbable.

In all those cases of *autumnal* intermittents, whether quotidian, tertian, or quartan, in which the bark did not succeed after three or four days trial,
I have

I have seldom found it fail after the application of blisters to the wrists.

But in those cases where blisters had been neglected, or applied without effect, and where the disease had been protracted into the *winter* months, I have generally cured it by means of one or two moderate bleedings.

The pulse in those cases is generally full, and sometimes a little hard, and the blood when drawn for the most part appears fizy.

The bark is seldom necessary to prevent the return of the disorder. It is always ineffectual, where blood-letting is indicated. I have known several instances where pounds of this medicine have been taken without effect, in which the loss of ten or twelve ounces of blood has immediately cured the disorder.

How shall we reconcile the practice of bleeding in intermittents, with our modern theories of fever?

May not such congestions be formed by them in the viscera, as to produce the same species of inflammatory action which occurs in several other inflammatory diseases from local causes?

Doctor

Doctor Cullen has taught us, in his account of the chronic hepatitis, that there may be topical affection and inflammatory diathesis, without much pain or fever; and had I not witnessed several cases of this kind, I should have been forced to have believed it possible, not only in this disorder, but in many others, from the facts which were communicated to me by Doctor Michaelis in his visit to Philadelphia in the year 1783.

It would be foreign to the present subject, or I could here demonstrate, that debility (so common and universal in intermittents) is a *necessary* predisposing cause of *all* inflammatory disorders.

I once intended to have added to this account of the efficacy of blisters and bleeding in curing obstinate intermittents, testimonies from a number of medical gentlemen, of the success with which they have used them; but these vouchers have become so numerous, that they would swell this essay far beyond the limits I wish to prescribe to it.

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A N

A C C O U N T

OF THE

DISORDER OCCASIONED BY DRINKING

Cold Water in Warm Weather,

AND THE METHOD OF CURING IT.

FEW summers elapse in Philadelphia, in which there are not instances of many persons being affected by drinking cold water. In some seasons four or five persons have died suddenly from this cause, in one day. This mortality falls chiefly upon the labouring part of the community, who seek to allay their thirst by drinking the water from the pumps in the streets, and who are too impatient, or too ignorant, to use the necessary precautions for preventing its morbid or deadly effects upon them. These accidents seldom happen, except when the mercury rises above 85° in Fahrenheit's thermometer.

Three

Three circumstances generally concur to produce disease or death from drinking cold water.

1. The patient is extremely warm. 2. The water is extremely cold. And, 3. A large quantity of it is suddenly taken into the body. The danger from drinking the cold water is always in proportion to the degrees of combination which occur in the three circumstances that have been mentioned.

The following symptoms generally follow, where cold water has been taken, under the above circumstances, into the body :

In a few minutes after the patient has swallowed the water, he is affected by a dimness of sight, he staggers in attempting to walk, and unless supported, falls to the ground ; he breaths with difficulty ; a rattling is heard in his throat ; his nostrils and cheeks expand and contract in every act of respiration ; his face appears suffused with blood, and of a livid colour ; his extremities become cold, and his pulse imperceptible ; and unless relief is speedily obtained, the disorder terminates in death in four or five minutes.

This description includes only the less common cases of the effects of drinking a *large* quantity of
cola

cold water, when the body is *preternaturally* heated. More frequently, patients are seized with acute spasms in the breast and stomach. These spasms are so painful as to produce syncope, and even asphyxia. They are sometimes of the tonic, but more frequently of the clonic kind. In the intervals of the spasms the patient appears to be perfectly well. The intervals between each spasm become longer or shorter, according as the disease tends to life or death.

It may not be improper to take notice, that punch, beer, and even toddy, when drank under the same circumstances as cold water, have all been known to produce the same morbid and fatal effects.

I know of but one certain remedy for this disease, and that is LIQUID LAUDANUM. The doses of it, as in other cases of spasm, should be proportioned to the violence of the disease. From a tea-spoonful to near a table-spoonful have been given in some instances, before relief has been obtained. Where the powers of life appear to be suddenly suspended, the same remedies should be used, which have been so successfully employed in recovering persons supposed to be dead from drowning.

Care should be taken in every case of disease, or apparent death, from drinking cold water, to prevent the patient's suffering from being surrounded, or even attended by too many people.

Persons who have been recovered from the immediate danger which attends this disease, are sometimes affected after it, by inflammations and obstructions in the breast or liver. These generally yield to the usual remedies which are administered in those complaints, when they arise from other causes.

If neither the voice of reason, nor the fatal examples of those who have perished from this cause, are sufficient to produce restraint in drinking a *large* quantity of *cold* liquors, when the body is *preternaturally* heated, then let me advise to

1. Grasp the vessel out of which you are about to drink for a minute or longer with both your hands. This will abstract a portion of heat from the body, and impart it at the same time to the cold liquor, provided the vessel is made of metal, glass, or earth; for heat follows the same laws, in many instances, in passing through bodies, with regard to its relative velocity, which we observe to take place in electricity.

2. If you are not furnished with a cup, and are obliged to drink by bringing your mouth in contact with the stream which issues from a pump, or a spring, always wash your hands and face previously to your drinking, with a little of the cold water. By receiving the shock of the water first upon those parts of the body, a portion of its heat is conveyed away, and the vital parts are thereby defended from the action of the cold.

AN
A C C O U N T

OF THE EFFICACY OF

C O M M O N S A L T,

IN THE CURE OF

HÆMOPYSIS.

FROM the present established opinions and practice respecting the cause and cure of hæmoptysis, the last medicine that would occur to a regular-bred physician for the cure of it, is COMMON SALT; and yet I have seen and heard of a great number of cases, in which it has been administered with success.

The mode of giving it, is to pour down from a tea to a table-spoonful of clean fine salt, as soon as possible after the hæmorrhage begins from the lungs. This quantity generally stops it; but the

dose must be repeated daily for three or four days, to prevent a return of the disorder. If the bleeding continues, the salt must be continued till it is checked, but in larger doses. I have heard of several instances in which two table-spoonsful were taken at one time for several days.

It sometimes excites a sickness at the stomach, and never fails to produce a burning sensation in the throat in its passage into the stomach, and considerably thirst afterwards.

I have found this remedy to succeed equally well in hæmorrhagies, whether they were active or passive, or whether they occurred in young or in old people.

I had prescribed it for several years before I could satisfy myself with a theory, to account for its extraordinary action upon the human body. My enquiries led me to attend more particularly to the following facts :

1. Those persons who have been early instructed in vocal music, and who use their vocal organs moderately through life, are seldom affected by an hæmorrhage from the lungs.

2. Law-

2. Lawyers, players, public cryers, and city watchmen, all of whom exercise their lungs either by long or loud speaking, are less affected by this disorder, than persons of other occupations.

I acknowledge I cannot extend this observation to the public teachers of religion. I have known several instances of their being affected by hæmoptysis; but never but one in which the disorder came on in the pulpit, and that was in a person who had been recently cured of it. The cases which I have seen, have generally been brought on by catarrhs.

To this disorder, the practice of some of our American preachers disposes them in a peculiar manner; for it is very common with this class of them, to expose themselves to the cold or evening air immediately after taking, what a celebrated and eloquent preacher used to call a *pulpit sweat*.

3. This hæmorrhage chiefly occurs in debilitated habits, or in persons afflicted by such a disposition to consumption, as indicates a weak and relaxed state of the lungs.

4. It generally occurs when the lungs are in a passive state; as in sitting, walking, and more

frequently in lying. Many of the cases that I have known, have occurred during *sleep* in the middle of the night.

From these facts, is it not probable that the common salt, by acting primarily and with great force upon the throat, extends its stimulus to the bleeding vessel, and by giving it a tone, checks the further effusion of blood?

I shall only add to this conjecture the following observations ;

1. I have never known the common salt perform a cure, where the hemorrhage from the lungs has been a symptom of a consumption. But even in this case it gives a certain temporary relief.

2. The exhibition of common salt in the hæmoptysis, should by no means supercede the use of occasional bleeding when indicated by plethora, nor of that diet which the state of the pulse, or of the stomach, may require.

3. I have given the common salt in one case with success, in an hæmorrhage from the stomach, accompanied by a vomiting; and have heard of
several

several cases in which it has been supposed to have checked a discharge of blood from the nose and uterus, but I can say nothing further in its favour in these last hæmorrhages, from my own experience.

It may perhaps serve to lessen the prejudices of physicians against adopting improvements in medicine, that are not recommended by the authority of colleges or universities, to add, that we are indebted to an old woman, for the discovery of the efficacy of common salt in the cure of hæmoptysis.

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FREE THOUGHTS

UPON THE

CAUSE AND CURE

OF THE

Pulmonary Consumption.

THE ancient Jews used to say that a man does not fulfil his duties in life, who passes through it, without building a house, planting a tree, and leaving a child behind him. A physician, in like manner, should consider his obligations to his profession and society as undischarged, who has not attempted to lessen the number of incurable diseases. This is my apology for presuming to make the consumption the subject of a medical inquiry.

Perhaps I may suggest an idea, or fact, that may awaken the ideas and facts which now lie useless in the memories or common-place books of other physicians; or I may direct their attention

tion

tion to some useful experiments upon this subject.

I shall begin my observations upon the consumption, by remarking,

1. that it is unknown among the Indians in North-America.

2. It is scarcely known by those citizens of the United States, who live in the *first* stage of civilized life, and who have lately obtained the title of the *first settlers*.

The principal occupations of the Indian consist in war, fishing, and hunting. Those of the first settler, are fishing, hunting, and the laborious employments of subduing the earth, cutting down forests, building a house and barn, and distant excursions in all kinds of weather, to mills and courts, all of which tend to excite and preserve in the system, something like the Indian vigour of constitution.

3. It is less common in country places than in cities, and increases in both, with intemperance and sedentary modes of life.

4. Ship

4. Ship and house carpenters, smiths, and all those artificers whose business requires great exertions of strength in the *open* air in *all* seasons of the year, are less subject to this disorder, than men who work under cover, and at occupations which do not require the constant action of their limbs.

5. Women who sit more than men, and whose work is connected with less exertion, are most subject to the consumption.

From these facts it would seem, that the most probable method of curing the consumption, is to revive in the constitution, by means of exercise or labour, that vigour which belongs to the Indians, or to mankind in their first stage of civilization.

The efficacy of these means of curing consumption will appear, when we inquire into the relative merit of the several remedies which have been used by physicians in this disorder.

I shall not produce among these remedies the numerous receipts for syrups, bolusses, electuaries, decoctions, infusions, pills, medicated waters, powders, draughts, mixtures, and diet-drinks, which
have

have so long and so steadily been used in this disease; nor shall I mention as a remedy, the best accommodated diet, submitted to with the most patient self-denial, for not one of them all without the aid of exercise has ever, I believe, cured a single consumption.

1. SEA-VOYAGES have cured consumptions; but it has been only when they have been so long, or so frequent, as to substitute the long continuance of gentle, to violent degrees of exercise of a shorter duration, or where they have been accompanied by some degree of the labour and care of navigating the ship.

2. A CHANGE of CLIMATE has often been prescribed for the cure of consumptions, but I do not recollect an instance of its having succeeded, except when it has been accompanied by exercise, as in travelling, or by some active laborious pursuit.

Doctor Gordon of Madeira, ascribes the inefficacy of the air of Madeira in the consumption, in part to the difficulty patients find of using exercise in carriages, or even on horseback, from the badness of the roads in that island.

3. JOUR-

3. JOURNIES have often performed cures in the consumption, but it has been chiefly when they have been long, and accompanied by difficulties which have roused and invigorated the powers of the mind and body.

4. VOMITS and NAUSEATING MEDICINES have been much celebrated for the cure of consumptions. These, by procuring a temporary determination to the surface of the body, so far lessen the pain and cough as to enable patients to use profitable exercise. Where this has not accompanied or succeeded the exhibition of vomits, I believe they have seldom afforded any *permanent* relief.

5. BLOOD-LETTING has often relieved consumptions; but it has been only by removing the troublesome symptoms of inflammatory diathesis, and thereby enabling the patients to use exercise, or labour, with advantage.

6. VEGETABLE BITTERS and some of the STIMULATING GUMS have in some instances afforded relief in consumptions; but they have done so only in those cases where there was great debility, accompanied by a total absence of inflammatory diathesis. They have most probably acted by
their

their tonic qualities as substitutes for labour and exercise.

7. A PLENTIFUL and REGULAR PERSPIRATION excited by means of a flannel shirt worn next to the skin, or by means of a stove-room, or by a warm climate, has in many instances *prolonged* life in consumptive habits ; but all these remedies have acted as palliatives only, and thereby have enabled the consumptive patients to enjoy the more beneficial effects of exercise.

8. BLISTERS, SETONS, and ISSUES, by determining the perspirable matter from the lungs to the surface of the body, lessen pain and cough, and thereby prepare the system for the more salutary effects of exercise.

9. The effects of SWINGING upon the pulse and respiration, leave us no room to doubt of its being a tonic remedy, and therefore a safe and agreeable substitute for exercise.

From all these facts it is evident that the remedies for consumptions must be sought for in those *exercises and employments which give the greatest vigour to the constitution*. And here I am happy in being able to produce several facts which demonstrate

monstrate the safety and certainty of this method of cure.

During the late war, I saw three instances of persons in confirmed consumptions who were perfectly cured by the hardships of a military life. They had been my patients previously to their entering into the army. Besides these, I have heard of four well attested cases of similar recoveries from nearly the same remedies. One of these was the son of a farmer in New-Jersey, who was sent to sea as the last resource for a consumption. Soon after he left the American shore, he was taken by a British cruiser, and compelled to share in all the duties and hardships of a common sailor. After serving in this capacity for twenty-two months, he made his escape, and landed at Boston, from whence he travelled on foot to his father's house, (nearly four hundred miles) where he arrived in perfect health.

Doctor Way of Wilmington informed me, that a certain Abner Cloud, who was reduced so low by a pulmonary consumption as to be beyond all relief from medicine, was so much relieved by sleeping in the open air, and by the usual toils of building a hut and improving a farm in the unsettled parts of a new country in Pennsylvania, that

that he thought him in a fair way of a perfect recovery.

Doctor Latimer of Wilmington had been long afflicted with a cough and an occasional hæmoptysis. He entered into the American army as a surgeon, and served in that capacity till near the end of the war; during which time he was perfectly free from all pulmonic complaints. The spitting of blood returned soon after he settled in private practice. To remedy this complaint, he had recourse to a low diet, but finding it ineffectual, he partook liberally of the usual diet of healthy men, and he now (as he lately informed me) enjoys a good share of health.

It would be very easy to add many other cases, in which labour, the employments of agriculture, and a life of hardship by sea and land, have prevented, relieved, or cured, not only the consumption, but pulmonary diseases of all kinds.

To the cases that have been mentioned, I shall add only one more, which was lately communicated to me by the venerable Doctor Franklin, whose conversation at all times conveys instruction, and not less in medicine than upon other subjects. In travelling, many years ago, through New-
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England,

England, the Doctor overtook the post-rider; and after some inquiries into the history of his life, he informed him that he was bred a shoemaker; that his confinement, and other circumstances, had brought on a consumption, for which he was ordered by a physician to ride on horseback. Finding this mode of exercise too expensive, he made interest, upon the death of an old post-rider, to succeed to his appointment, in which he perfectly recovered his health in two years. After this he returned to his old trade, upon which his consumption returned. He again mounted his horse, and rode post in all seasons and weathers, between New-York and Connecticut river, (about 140 miles) in which employment he continued upwards of thirty years, in perfect health.

These facts, I hope, are sufficient to establish the advantages of restoring the original vigour of the constitution, in every attempt to effect a radical cure of consumption.

But how shall these remedies be applied in the time of peace, or in a country where the want of woods, and brooks without bridges, forbid the attainment of the laborious pleasures of the Indian mode of hunting; or where the universal extent of civilization does not admit of our advising the

toils of a new settlement, and improvements upon *bare* creation? Under these circumstances, I conceive substitutes may be obtained for each of them, nearly of equal efficacy, and attainable with much less trouble.

1. Doctor Sydenham pronounced *riding on horse-back*, to be as certain a cure for consumptions as bark is for an intermitting fever. I have no more doubt of the truth of this assertion, than I have that inflammatory fevers are now less frequent in London than they were in the time of Doctor Sydenham. If riding on horseback in consumptions has ceased to be a remedy in Britain, the fault is in the patient, and not in the remedy. "It is a sign that the stomach requires milk," (says Doctor Cadogan) when it cannot bear it." In like manner, the inability of the patient to bear this manly and wholesome exercise, serves only to demonstrate the necessity and advantages of it. I suspect the same objections to this exercise which have been made in Britain, will not occur in the United States of America; for the Americans, with respect to the symptoms and degrees of epidemic and chronic diseases appear to be nearly in the same state that the inhabitants of England were in the seventeenth century. I can easily conceive the vigour of the human constitution

tion to have been such in Doctor Sydenham's time, as that a defluxion or ulcer in the lungs should have had no more effect in increasing the action of the arterial system, than a moderate inflammation of the eyes has at present in exciting an inflammatory fever in a good constitution; hence the safety and advantage formerly of riding on horseback in pulmonic complaints. We find, in proportion to the decline of the vigour of the body, that many occasional causes produce fever and inflammation, which would not have done it an hundred years ago.

2. The laborious employments of agriculture, if steadily pursued, and accompanied at the same time by the simple, but wholesome diet of a farmhouse, and a hard bed, would probably afford a good substitute for the toils of a savage or military life.

3. Such occupations or professions as require constant labour or exercise in the open air in all kinds of weather, may easily be chosen for a young man who, either from hereditary predisposition, or an accidental affection of the lungs, is in danger of falling into a consumption. In this we should imitate the advice given by some wise men, always to prefer those professions for our sons

which are the least favourable to the corrupt inclinations of their hearts. For example, where an undue passion for money, or a crafty disposition discover themselves in early life, we are directed to oppose them by the less profitable and more disinterested professions of divinity, or physic, rather than cherish them by trade, or the practice of the law*.

4. There is a case recorded by Dr. Smollet, of the efficacy of the *cold bath* in a consumption; And I have heard of its having been used with success in the case of a negro man in one of the West-India Islands. To render this remedy useful, or even safe, it will be necessary to join it with labour, or to use it in degrees that shall prevent the alternation of the system with vigour and debility; for I take the cure of consumption to

* It is very common for parents to prefer sedentary occupations for such of their children who are of delicate constitutions, and the more active occupations for those of them who are robust. The *reverse* of this practice should be followed. The weakly children should be trained to the laborious, and the robust to the sedentary occupations. From a neglect of this practice, many hundred apprentices to taylor, shoemakers, conveyancers, watchmakers, silversmiths, mantua-makers, &c. &c. perish every year by consumptions.

depend

depend upon the simple action of tonic, without the least mixture of debilitating powers. Indeed, I conceive it to be easier to palliate the symptoms, and prolong life, by the use of powers which are *simply debilitating*, than by a mixture of both of them. This is not a solitary fact in the human body. We often see a stiff neck and spasms, brought on by a person's being exposed, at the same time, to a stream of air from a door or a window, and to the heat of a warm room, where neither would have been injurious if it had acted singly upon the system. There are many extremes in physic, as in other things, which meet in a point. There is an inflammatory diathesis connected with debility, as certainly as with an excess of tone in the arterial system. And I think I have seen greater degrees of this inflammatory diathesis in the male inhabitants of cities, than of the country, and more in women than in men. I have moreover seen the most acute inflammatory diseases where the system had been previously debilitated by a long continuance of warm weather, or of an obstinate intermitting fever, and in too many instances by the use of spirituous liquors. It is the presence of this species of inflammatory diathesis which renders consumptions so much more difficult to cure than formerly? Is it *this* which often renders riding on horseback so

ineffectual, or so injurious in this disorder? I suspect it is; and it is to be lamented that it often requires so much time, or such remedies to remove this species of inflammatory diathesis, as to reduce the patient too low to make use of those remedies afterwards which would effect a radical cure.

If it were possible to graduate the tone of the system by means of a scale, I would add, that to cure consumptions, the system should be raised to the highest degree of this scale. Nothing short of an equilibrium of tone, or a free and vigorous action of every muscle and viscus in the body, will fully come up to a radical cure for consumptions.

* In regulating the diet of consumptive patients, I conceive it to be as necessary to feel the pulse, as it is in determining when and in what quantity to draw blood. Where inflammatory diathesis prevails, a vegetable diet is certainly proper; but where the patient has *escaped*, or *passed* this stage of the disorder, I believe a vegetable diet alone to be injurious; and am sure a moderate quantity of animal food may be taken with advantage. In both cases, the diet should consist, as much as possible, of one kind of aliment.

The presence or absence of this inflammatory diathesis, furnishes the indications for administering or refraining from the use of the bark and balsamic medicines. With all the testimonies of their having done mischief, many of which I could produce, I have known several cases in which they have been given with obvious advantage; but it was only when there was a total absence of inflammatory diathesis.

Perhaps the remedies I have recommended, and the opinions I have delivered, may derive some support from attending to the analogy of ulcers on the legs, and in other parts of the body. The first of these occur chiefly in habits debilitated by spirituous liquors, and the last frequently in habits debilitated by the scrophula. In curing these disorders, it is in vain to depend upon internal or external medicines. The whole system must be strengthened, or we do nothing; and this is to be effected only by exercise and a generous diet.

In relating the facts that are contained in this essay, I wish I could have avoided reasoning upon them; especially as I am confident of the certainty of the facts, and somewhat doubtful of the truth of my reasonings.

I shall only add, that if the cure of consumptions should at last be effected by remedies in every respect the opposites of those palliatives which are now fashionable and universal, no more will happen than what we have already seen in the tetanus, the small-pox, and the management of fractured limbs.

Should this be the case, we shall not be surprised to hear of physicians, instead of prescribing any one, or all of the medicines formerly enumerated for consumptions, ordering their patients to exchange the amusements, or indolence of a city, for the toils of a country life; of their advising farmers to exchange their plentiful tables, and comfortable fire-sides, for the scanty but solid subsistence, and midnight exposure of the herdsman; or of their recommending, not so much the exercise of a *passive* sea-voyage, as the *active* labours and dangers of a common sailor. Nor should it surprise us, after what we have seen, to hear patients relate the pleasant adventures of their excursions or labours, in quest of their recovery from this disorder, any more than it does now to see a strong or well shaped limb that has been broken; or to hear a man talk of his studies, or pleasures, during the time of his being inoculated and attended for the small-pox.

I will

I will not venture to assert, that there does not exist a medicine which shall supply, at least in some degree, the place of the labour or exercises, whose usefulness in consumptions has been established by the facts that have been mentioned. Many instances of the analogous effects of medicines, and of exercise upon the human body, forbid the supposition. I shall only add, that if there does exist in nature such a medicine, I am disposed to believe it will be found in the class of TONICS. If this should be the case, I conceive its strength, or its dose, must far exceed the present state of our knowledge or practice, with respect to the efficacy or dose of tonic medicines.

I except the disorder, which arises from recent abscesses in the lungs, from the general observation which has been made, respecting the inefficacy of the remedies that were formerly enumerated for the cure of consumptions without labour or exercise. These abscesses, often occur without being preceded by general debility, or accompanied by a consumptive diathesis, and are frequently cured by nature, or by very simple medicines.

OBSERVATIONS

UPON

WORMS

IN THE ALIMENTARY CANAL.

AND UPON

ANTHELMINTIC MEDICINES.

WITH great diffidence I venture to lay before the public my opinions upon worms: nor should I have presumed to do it, had I not entertained a hope of thereby exciting further inquiries upon this subject.

When we consider how universally worms are found in all young animals, and how frequently they exist in the human body, without producing disease of any kind, it is natural to conclude, that they serve some useful and necessary purposes in the animal œconomy. Do they consume the superfluous

perfluous aliment which all young animals are disposed to take before they have been taught, by experience or reason, the bad consequences which arise from it? It is no objection to this opinion, that worms are unknown in the human body in some countries. The laws of nature are diversified, and often suspended under peculiar circumstances in many cases, where the departure from uniformity is still more unaccountable, than in the present instance. Do worms produce diseases from an *excess* in their *number*, and an *error* in their place in the same manner that blood, bile and air produce diseases from an *error* in their place, or from *excess* in their *quantities*? Before these questions are decided, I shall mention a few facts which have been the result of my own observations upon this subject.

1. In many instances I have seen worms discharged in the small-pox and measles, from children who were in perfect health previously to their being attacked by those disorders, and who never before discovered a single symptom of worms. I shall say nothing here of the swarms of worms which are discharged in fevers of all kinds, until I attempt to prove that an idiopathic fever is never produced by worms.

2. Nine out of ten of the cases which I have seen of worms, have been in children of the grossest habits and most vigorous constitutions*. This is more especially the case where the worms are dislodged by the small-pox and measles.

3. In weakly children, I have often known the most powerful anthelmintics given without bringing away a single worm. If these medicines have afforded any relief, it has been by their tonic quality. From this fact, is it not probable—The conjecture I am afraid is too bold—but I will risk it. Is it not probable, I say, that children are sometimes disordered from the want of worms? Perhaps the tonic medicines which have been mentioned, render the bowels a more quiet and comfortable asylum for them, and thereby provide the system with the means of obviating the effects of

* Since the above observations upon worms were committed to paper, I have met with the following facts, in a letter from Doctor Capelle of Wilmington, which has been read in the College of Physicians of Philadelphia. In the livers of sixteen, out of eighteen rats which he dissected, he informed me that he found a number of the *tænia* worms. The rats were fat, and appeared in other respects to have been in perfect health. The two rats in which he found no worms, he says, “were very lean, and their livers smaller “in proportion than the others.”

crapulas,

crapulas, to which all children are disposed. It is in this way that nature, in many instances, cures evil by evil. I confine the salutary office of worms only to that species of them which is known by the name of the round worm, and which occurs most frequently in children.

Is there any such disease as an idiopathic WORM-FEVER? The Indians in this country say there is not, and ascribe the discharge of worms to a fever, and not a fever to the worms*.

By adopting this opinion, I am aware that I contradict the observations of many eminent and respectable physicians.

Doctor Huxham describes an epidemic pleurisy, in the month of March in the year 1740, which he supposes was produced by his patients feeding upon some corn that had been injured by the rain the August before†. He likewise mentions that a number of people, and these too of the elderly fort‡, were afflicted at one time with worms in the month of April in the year 1743.

* See the Inquiry into the Diseases of the Indians, p. 24.

† Vol. II. of his Epidemics, p. 56. ‡ P. 136.

Lieutaude gives an account of an epidemic worm-fever from Velchius, an Italian physician * ; and Sauvages describes, from Vandermonde, an epidemic dysentery from worms, which yielded finally only to worm medicines †. Sir John Pringle, and Doctor Monro, likewise frequently mention worms as accompanying the dysentery and remitting fever, and recommend the use of calomel as an antidote to them.

I grant that worms appear more frequently in some epidemic diseases than in others, and oftener in some years than in others. But may not the same heat, moisture and diet, which produced the diseases, have produced the worms? And may not their discharge from the bowels have been occasioned in those epidemics, as in the small-pox and measles, by the increased heat of the body; by the want of nourishment; or by an anthelmintic quality being accidentally combined with some of the medicines that are usually given in fevers?

In answer to this, we are told that we often see the crisis of a fever brought on by the discharge of worms from the bowels by means of a purge,

* Vol. I. p. 76.

† Vol. II. p. 329.

or by an anthelmintic medicine. Whenever this is the case, I believe it is occasioned by offending bile being dislodged by means of the purge at the same time with the worms, or by the anthelmintic medicine (if not a purge) having been given on, or near one of the usual critical days of the fever. What makes the latter supposition probable is, that worms are seldom suspected in the beginning of fevers, and anthelmintic medicines seldom given, till every other remedy has failed of success; and this generally happens about the usual time in which fevers terminate in life or death.

It is very remarkable, that since the discovery and description of the hydrocephalus internus, we hear and read much less than formerly of worm-fevers. I suspect that disorder of the brain has laid the foundation for the principal part of the cases of worm-fevers which are upon record in books of medicine. I grant that worms sometimes increase the danger from fevers, and often confound the diagnosis and prognosis of them, by a number of new and analogous symptoms. But here we see nothing more than that complication of symptoms which often occurs in diseases of a very different and opposite nature. How often are we puzzled by hysteric and hypocondriac symptoms

in a fever; and yet what physician ever thought of an hystERIC or an hypocondriac fever*?

Having rejected worms as the cause of fevers, I proceed to remark, that the diseases most commonly produced by them, belong to the class of NEUROSES. And here I might add, that there is scarcely a disease, or a symptom of a disease, belonging to this class, which is not produced by worms. It would be only publishing extracts from books, to describe them.

The *chronic* and *nervous* diseases of children, which are so numerous and frequently fatal, are, I believe, most commonly occasioned by worms. There is no great danger, therefore, of doing mischief by prescribing anthelmintic medicines in all our first attempts to cure the chronic and nervous diseases.

I have taken great pains to find out, whether the presence of the different species of worms might not be discovered by certain peculiar symptoms;

* I have been much gratified by finding myself supported in the above theory of worm-fevers, by the late Dr. William Hunter, and by Dr. Butter in his excellent treatise upon the infantile remitting fever.

but all to no purpose. I once attended a girl of twelve years of age in a fever, who discharged four yards of a *tænia*, and who was so far from having discovered any peculiar symptom of this species of worms, that she had never complained of any other indisposition, than now and then a slight pain in the stomach, which often occurs in young girls from a sedentary life, or from errors in their diet. I beg leave to add further, that there is not a symptom which has been said to indicate the presence of worms of any kind, as the cause of a disease, that has not deceived me; and none finer than the one that has been so much depended upon, viz. the picking of the nose. A discharge of worms from the bowels, is, perhaps, the only symptom that is pathognomonic of their presence in the intestines.

I shall now make a few remarks upon anthelmintic remedies.

But I shall first give an account of some experiments which I made in the year 1771, upon the common earth-worm, in order to ascertain the anthelmintic virtues of a variety of substances. I made choice of the earth-worm for this purpose, as it is, according to naturalists, exactly the same in its structure, manner of subsistence, and mode
of

of propagating its species, with the round worm of the human body.

In the first column I shall set down, under distinct heads, the substances in which worms were placed; and in the second and third columns the *time* of their death, from the action of these substances upon them.

| I. BITTER and ASTRINGENT SUBSTANCES. | | Hours. | Minutes. |
|--|---|--------|---|
| Watery Infusion of Aloes, | | 2 | 48 |
| ———— of Rhubarb, | | 1 | 30 |
| ———— of Peruvian bark, | | 1 | 30 |
| II. PURGES. | | | |
| Watery Infusion of Jalap, | | 1 | — |
| ———— of Bears-foot, | | 1 | 17 |
| ———— of Gamboge, | | 1 | — |
| III. SALTS. | | | |
| 1. <i>Acids.</i> | | | |
| Vinegar, - - - | — | 1½ | convulsed. |
| Lime Juice, - - - | — | 1 | |
| Diluted nitrous Acid, | — | 1½ | |
| 2. <i>Alkali.</i> | | | |
| A watery Solution of Salt of Tartar, - - - | — | 2 | convulsed, throwing up a mucus on the surface of the water. |
| 3. <i>Neutral Salts.</i> | | | |
| In a watery Solution of common Salt, - - - | — | 1 | convulsed. |
| ———— of Nitre, - - - | — | | ditto. |
| ———— of Sal Diuretic, - - - | — | | ditto. |
| ———— of Sal Ammoniac, - - - | — | 1½ | |
| ———— of common Salt and Sugar, - - - | — | 4 | |
| P 2 | | | 4. <i>Earthy</i> |

| 4. <i>Earthy and Metallic Salts.</i> | | Hours. | Minutes. |
|--------------------------------------|------|------------------|------------|
| In a watery Solution of | | | |
| Epsom Salt, - - | — | 15 $\frac{1}{2}$ | |
| — of Rock Alum, - | — | 10 | |
| — of Corrosive Subli- | | | |
| mate, - | — | 1 $\frac{1}{2}$ | convulsed. |
| — of Calomel, - - | — | 49 | |
| — of Turpeth Mineral, | — | 1 | convulsed. |
| — of Sugar of Lead, | — | 3 | |
| — of green Vitriol, - | — | 1 | |
| — of blue Vitriol. - | — | 10 | |
| — of white Vitriol, - | — | 30 | |
| IV. METALS. | | — | |
| Filings of Steel, - - | 1 | 25 $\frac{1}{2}$ | |
| Filings of Tin - - - | | — | |
| V. CALCAREOUS EARTH. | | 2 | |
| Chalk, - - - | | — | |
| VI. NARCOTIC SUBSTANCES. | | | |
| Watery Infusion of Opium, | — | 11 $\frac{1}{2}$ | convulsed. |
| — of Carolina Pink-root, | — | 33 | |
| — of Tobacco, | — | 14 | |
| VII. ESSENTIAL OILS. | | | |
| Oil of Wormwood, - - | — | 3 | convulsed. |
| — of Mint, - - - | — | 3 | |
| — of Caraway Seed, | — | 3 | |
| — of Amber, - - - | — | 1 $\frac{1}{2}$ | |
| — of Anniseed, - - | — | 4 $\frac{1}{2}$ | |
| — of Turpentine, - | — | 6 | |
| VIII. ARSENIC. | | | |
| A watery Solution of white | near | | |
| Arsenic, - - - | 2 | — | |
| IX. FERMENTED LIQUORS. | | | |
| In Madeira Wine, - | — | 3 | convulsed. |
| — Claret, - - - | — | 10 | |

X. DISTILLED

| X. DISTILLED SPIRIT. | | Hours. | Minutes. |
|---|-----|--------|--------------|
| Common Rum, | - - | — | 1 convulsed. |
| XI. THE FRESH JUICES OF RIPE FRUITS. | | | |
| The Juice of red Cherries, | | — | 5½ |
| — of black ditto, | | — | 5 |
| — of red Currants, | - | — | 2¾ |
| — of Gooseberries, | - | — | 3¼ |
| — of Whortleberries, | - | — | 12 |
| — of Blackberries, | - | — | 7 |
| — of Raspberries, | - | — | 5½ |
| — of Plumbs, | - - | — | 13 |
| — of Peaches, | - - | — | 25 |
| — of Watermelons, no effect, | - - | — | — |
| XII. SACCHARINE SUBSTANCES. | | | |
| Honey, | - - | — | 7 |
| Molasses, | - - | — | 7 |
| Brown Sugar, | - - | — | 30 |
| Manna, | - - | — | 2½ |
| XIII. IN AROMATIC SUBSTANCES. | | | |
| Camphor, | - - | — | 5 |
| Pimento, | - - | — | 3½ |
| Black Pepper, | - - | — | 45 |
| XIV. FOETID SUBSTANCES. | | | |
| Juice of Onions, | - - | — | 3½ |
| Watery Infusion of Aſſa- ſœtida, | - - | — | 27 |
| — Santonicum, or Worm Seed, | - - | 1 | |
| XV. MISCELLANEOUS SUBSTANCES. | | | |
| Sulphur mixed with Oil, | | 2 | — |
| Æthiops Mineral, | - | 2 | |
| Sulphur, | - - | 2 | |

| | | | | | |
|------------------------|---|---|---|---|-----------------|
| Solution of Gunpowder, | - | - | - | — | 1 $\frac{1}{4}$ |
| ———of Soap, | - | - | - | — | 19 |
| Oxymel of Squills, | - | - | - | — | 3 $\frac{1}{4}$ |
| Sweet Oil. | - | - | - | 2 | 30 |

In the application of these experiments to the human body, an allowance must always be made for the alteration which the several anthelmintic substances that have been mentioned, may undergo from mixture and diffusion in the stomach and bowels.

In order to derive any benefit from these experiments, as well as from the observations that have been made upon anthelmintic medicines, it will be necessary to divide them into such as act,

1. Mechanically,
2. Chemically upon worms; and,
3. Into those which possess a power composed of chemical and mechanical qualities.

1. The mechanical medicines act indirectly and directly upon the worms.

Those which act *indirectly* are, vomits, purges, bitter and astringent substances, particularly aloes, rhubarb,

rhubarb, bark, bear's-foot, and worm-feed. Sweet-oil acts indirectly and very feebly upon worms. It was introduced into medicine from its efficacy in destroying the botts in horses; but the worms which infest the human bowels, are of a different nature, and possess very different organs of life from those which are found in the stomach of an horse.

Those mechanical medicines which act *directly* upon the worms, are, cowhage * and powder of tin. The last of these medicines has been supposed to act chemically upon the worms, from the arsenic which adheres to it; but from the length of time a worm lived in a solution of white arsenic, it is probable the tin acts altogether mechanically upon them.

2. The medicines which act chemically upon worms, appear, from our experiments, to be very numerous.

Nature has wisely guarded children against the morbid effects of worms, by implanting in them an early appetite for common salt, ripe fruits and saccharine substances; all of which appear to be.

* *Dolichos Pruriens*, of Linnæus.

among the most speedy and effectual poisons for worms.

Let it not be said, that nature here counteracts her own purposes. Her conduct in this business is conformable to many of her operations in the human body, as well as throughout all her works. The bile is a necessary part of the animal fluids, and yet an appetite for ripe fruits seems to be implanted chiefly to obviate the consequences of its excess, or acrimony, in the summer and autumnal months.

The use of common salt as an anthelmintic medicine, is both ancient and universal. Celsus recommends it. In Ireland it is a common practice to feed children, who are afflicted by worms, for a week or two upon a salt-sea weed, and when the bowels are well charged with it, to give a purge of wort in order to carry off the worms, after they are debilitated by the salt diet.

I have administered many pounds of common salt coloured with cochineal, in doses of half a drachm, upon an empty stomach in the morning, with great success in destroying worms.

Ever since I observed the effects of sugar and other sweet substances upon worms, I have recommended

mended the liberal use of all of them in the diet of children, with the happiest effects. The sweet substances probably act in preventing the diseases from worms in the stomach only, into which they often insinuate themselves, especially in the morning. When we wish to dislodge worms from the bowels by sugar or melasses, we must give these substances in large quantities, so that they may escape in part the action of the stomach upon them.

I can say nothing from my own experience of the efficacy of the mineral salts, composed of copper, iron and zinc, combined with vitriolic acid, in destroying worms in the bowels. Nor have I ever used the corrosive sublimate in small doses as an anthelmintic.

I have heard well-attested cases of the efficacy of the oil of turpentine in destroying worms.

The expressed juices of onions and of garlic are very common remedies for worms. From one of the experiments it appears that the onion juice possesses strong anthelmintic virtues.

I have often prescribed a tea-spoonful of gunpowder in the morning upon an empty stomach,
with

with obvious advantage. The active medicine here is probably the nitre.

I have found a syrup made of the bark of the Jamaica cabbage-tree*, to be a powerful as well as a most agreeable anthelmintic medicine. It sometimes purges and vomits, but its good effects may be obtained without giving it in such doses as to produce these evacuations.

There is not a more *certain* anthelmintic than Carolina pink-root†. But as there have been instances of death having followed excessive doses of it, imprudently administered; and as children are often affected by giddiness, stupor, and a redness and pain in the eyes, after taking it, I acknowledge that I have generally preferred to it, less certain, but more safe medicines for destroying worms.

3. Of the medicines whose action is compounded of mechanical and chemical qualities, calomel, jalap, and the powder of steel, are the principal.

Calomel, in order to be effectual, must be given in large doses. It is a safe and powerful anthel-

* Geoffrea, of Linnæus.

† Spigelia Marylandica, of Linnæus.

mintic. Combined with jalap, it often brings away worms when given for other purposes.

Of all the medicines that I have administered, I know of none more safe and certain than the simple preparations of iron, whether they be given in the form of steel-filings or of the rust of iron. If ever they fail of success, it is because they are given in too small doses. I generally prescribe from five, to thirty grains every morning, to children between one year, and ten years old; and I have been taught by an old sea-captain, who was cured of a *tænia* by this medicine, to give from two drachms to half an ounce of it, every morning, for three or four days, not only with safety, but with success.

I shall conclude this essay with the following remarks.

I. Where the action of medicines upon worms in the bowels does not agree exactly with their action upon the earth-worms in the experiments that have been related, it must be ascribed to the medicines being more or less altered by the action of the stomach upon them. I conceive that the superior anthelmintic qualities of Pink-root, steel-filings and calomel (all of which acted but slowly upon

upon the earth-worms compared with many other substances) are in a great degree occasioned by their escaping the digestive powers unchanged, and acting in a concentrated state upon the worms.

2. In fevers attended with anomalous symptoms, which are supposed to arise from worms, I have constantly refused to yield to the solicitations of my patients, to abandon the indications of cure in the fever, and to pursue worms as the *principal* cause of the disease. While I have adhered steadily to the usual remedies for the different genera and species of fever, in all their stages, I have at the same time blended those remedies occasionally with anthelmintic medicines. In this I have imitated the practice of physicians in many other diseases; in which troublesome and dangerous symptoms are pursued, without seducing the attention from the original disorder.

A N

A C C O U N T

O F T H E

E X T E R N A L U S E O F A R S E N I C

I N T H E

Cure of Cancers.

Read before the American Philosophical Society,
February 3, 1786.

A FEW years ago, a certain Doctor Hugh Martin, a surgeon of one of the Pennsylvania regiments stationed at Pittsburg, during the latter part of the late war, came to this city, and advertised to cure cancers with a medicine which he said he had discovered in the woods, in the neighbourhood of the garrison. As Dr. Martin had once been my pupil, I took the liberty of waiting upon him, and asked him some questions respecting his discovery. His answers were calculated to make me believe, that his medicine

was of a vegetable nature, and that it was originally an Indian remedy. He shewed me some of the medicine, which appeared to be the powder of a well dried root of some kind. Anxious to see the success of this medicine in cancerous sores, I prevailed upon the doctor to admit me to see him apply it in two or three cases. I observed in some instances, he applied a powder to the parts affected, and in others only touched them with a feather dipped in a liquid which had a white sediment, and which he made me believe was the vegetable root diffused in water. It gave me great pleasure to witness the efficacy of the doctor's applications. In several cancerous ulcers the cures he performed were complete. Where the cancers were much connected with the lymphatic system, or accompanied with a scrophulous habit of body, his medicine always failed, and, in some instances, did evident mischief.

Anxious to discover a medicine that promised relief in even a few cases of cancers, and supposing that all the caustic vegetables were nearly alike, I applied the phytolacca or poke-root, the stramonium, the arum, and one or two others, to foul ulcers, in hopes of seeing the same effects from them which I had seen from Doctor Martin's powder; but in these I was disappointed.

They

They gave some pain, but performed no cures. At length I was furnished by a gentleman from Pittsburgh with a powder, which I had no doubt, from a variety of circumstances, was of the same kind as that used by Doctor Martin. I applied it to a fungous ulcer, but without producing the degrees of pain, inflammation, or discharge, which I had been accustomed to see from the application of Doctor Martin's powder. After this, I should have suspected that the powder was not a *simple* root, had not the doctor continued upon all occasions to assure me, that it was wholly a vegetable preparation.

In the beginning of the year 1784, the doctor died, and it was generally believed that his medicine had died with him. A few weeks after his death I procured, from one of his administrators, a few ounces of the doctor's powder, partly with a view of applying it to a cancerous sore which then offered, and partly with a view of examining it more minutely than I had been able to do during the doctor's life. Upon throwing the powder, which was of a brown colour, upon a piece of white paper, I perceived distinctly a number of white particles scattered through it. I suspected at first that they were corrosive sublimate, but the usual tests of that metallic salt soon convinced me

that I was mistaken. Recollecting that arsenic was the basis of most of the celebrated cancer powders that have been used in the world, I had recourse to the tests for detecting it. Upon sprinkling a small quantity of the powder upon some coals of fire, it emitted the garlick smell so perceptibly as to be known by several persons whom I called into the room where I made the experiment, and who knew nothing of the object of my enquiries. After this with some difficulty I picked out about three or four grains of the white powder, and bound them between two pieces of copper, which I threw into the fire. After the copper pieces became red hot, I took them out of the fire, and when they had cooled, discovered an evident whiteness imparted to both of them. One of the pieces afterwards looked like dull silver. These two tests have generally been thought sufficient to distinguish the presence of arsenic in any bodies; but I made use of a third, which has lately been communicated to the world by Mr Bergman, and which is supposed to be in all *cases* infallible.

I infused a small quantity of the powder in a solution of a vegetable alkali in water for a few hours, and then poured it upon a solution of blue vitriol in water. The colour of the vitriol was
 imme-

immediately changed to a beautiful green, and afterwards precipitated.

I shall close this paper with a few remarks upon this powder, and upon the cure of cancers and foul ulcers of all kinds.

1. The use of caustics in cancers and foul ulcers is very antient, and universal. But I believe *arsenic* to be the most efficacious of any that has ever been used. It is the basis of Plunket's and probably of Guy's well known cancer powders. The great art of applying it successfully, is to dilute and mix it in such a manner as to mitigate the violence of its action. Doctor Martin's composition was happily calculated for this purpose. It gave less pain than the common or lunar caustic. It excited a moderate inflammation, which separated the morbid from the sound parts, and promoted a plentiful afflux of humours to the fore during its application. It seldom produced an eschar; hence it insinuated itself into the deepest recesses of the cancers, and frequently separated those fibres in an unbroken state which are generally called the roots of the cancer. Upon this account, I think, in an ulcerated cancer it is to be preferred to the knife. It has no action upon the sound skin. This Doctor Hall proved by confining

a small quantity of it upon his arm for many hours. In those cases where Doctor Martin used it to extract cancerous or scirrhous tumours that were not ulcerated, I have reason to believe that he always broke the skin with Spanish flies.

2. The arsenic used by the doctor was the pure white arsenic. I should suppose from the examination I made of the powder with the eye, that the proportion of arsenic to the vegetable powder, could not be more than $\frac{1}{10}$ part of the whole compound. I have reason to think that the doctor employed different vegetable substances at different times. The vegetable matter with which the arsenic was combined in the powder which I used in my experiments, was probably nothing more than the powder of the root and berries of the solanum lethale, or deadly nightshade. As the principal, and perhaps the only design of the vegetable addition was to blunt the activity of the arsenic, I should suppose that the same proportion of common wheat flour as the doctor used of his caustic vegetables, would answer nearly the same purpose. In those cases where the Doctor applied a feather dipped in a liquid to the fore of his patient, I have no doubt but his phial contained nothing but a weak solution of arsenic in water. This is no new method of applying arsenic to foul
ulcers.

ulcers. Doctor Way of Wilmington, has spoken in the highest terms to me of a wash for foulnesses on the skin, as well as old ulcers, prepared by boiling an ounce of white arsenic in two quarts of water to three pints, and applying it once or twice a day.

3. I mentioned, formerly, that Doctor Martin was often unsuccessful in the application of his powder. This was occasioned by his using it indiscriminately in *all* cases. In schirrous and cancerous tumours, the knife should always be preferred to the caustic. In cancerous ulcers attended with a scrophulous or a bad habit of body, such particularly as have their seat in the neck, in the breasts of females, and in the axillary glands, it can only protract the patient's misery. Most of the cancerous sores cured by Doctor Martin were seated on the nose, or cheeks, or upon the surface or extremities of the body. It remains yet to discover a cure for cancers that taint the fluids, or infect the whole lymphatic system. This cure I apprehend must be sought for in diet, or in the long use of some internal medicine.

To pronounce a disease incurable, is often to render it so. The intermitting fever, if left to itself, would probably prove frequently, and per-

haps more speedily fatal than cancers. And as cancerous tumours and sores are often neglected, or treated improperly by injudicious people, from an apprehension that they are incurable, (to which the frequent advice of physicians "to let them alone," has no doubt contributed) perhaps the introduction of arsenic into regular practice as a remedy for cancers, may invite to a more early application to physicians, and thereby prevent the deplorable cases that have been mentioned, which are often rendered so by delay or unskilful management.

4. It is not in cancerous sores only that Doctor Martin's powder has been found to do service. In sores of all kinds, and from a variety of causes, where they have been attended with fungous flesh or callous edges, I have used the doctor's powder with advantage.

I flatter myself that I shall be excused in giving this detail of a *quack* medicine, when the society reflect that it was from the inventions and temerity of quacks, that physicians have derived some of their most active and most useful medicines.

O B S E R V A T I O N S

ON THE

CAUSE AND CURE

OF THE

T E T A N U S.

Read before the AMERICAN PHILOSOPHICAL SOCIETY,
March 17, 1786.

DURING my attendance, as physician-general, upon the military hospitals of the United States, in the course of the late war, I met with several cases of the tetanus. I had frequently met with this disorder in private practice, and am sorry to say, that I never succeeded with the ordinary remedy of opium in any one case that came under my care. I found it equally ineffectual in the army. Baffled in my expectations from a remedy that had been so much celebrated, I began to investigate more particularly the nature of the disorder. I found it to be a disorder of warm cli-

mates, and warm seasons. This led me to ascribe it to relaxation. I resolved to attempt the cure of it by medicines in some measure the opposites of most of those which have been employed in that disorder. Soon after I adopted this resolution, I was called to visit Col. John Stone, who was wounded through the foot at the battle of Germantown, on the 4th of October 1777. He was in the third day of a tetanus. His spasms were violent, and his pains so exquisite, that his cries were heard near a hundred yards from his quarters. His head was thrown a little backwards, and his jaw had become stiff and contracted. He was under the care of a skilful regimental surgeon, who was pouring down opium in large quantities without effect.

Duty and friendship both led me to do my utmost to save the life of this valuable officer. I immediately dismissed the opium, and gave him large quantities of wine and bark, to the amount of two or three ounces of the latter, and from a bottle to three pints of the former in the day. In a few hours I was delighted with their effects. His spasms and pains were less frequent and violent, and he slept for several hours, which he had not done for several days and nights before.

With

With the same indication in view, I applied a blister between his shoulders, and rubbed in two or three ounces of mercurial ointment upon the outside of his throat. He continued to mend gradually under the operation of these medicines, so that in ten days he was out of danger, although the spasm continued in his wounded foot for several weeks afterwards.

In the summer of the year 1782, I was called to visit a servant girl of Mr. Alexander Todd, merchant of this city, who had brought on a tetanus by sleeping in the evening on a damp brick pavement, after a day in which the mercury in Fahrenheit's thermometer had stood at near 90°. The case was nearly as violent and alarming as the one I have described. I treated her in the same manner, and with the same success. To the above named medicines, I added only the oil of amber, which she took in large doses, after I suspected the tonic and stimulating powers of the bark and wine began to lose their effects. The good effects of the oil were very obvious. She recovered gradually, and has continued ever since in good health.

In the summer of the same year, I was called to Alexander Leslie, a joiner who had run a nail

into his foot. I found him the day afterwards in extreme pain, with small convulsions, and now and then a twinge in his jaw. The wound in his foot was without swelling or inflammation. I dilated the wound and filled it with lint moistened with spirit of turpentine. This in a little while produced a good deal of pain and a great inflammation in his foot. While I was preparing to treat him in the manner I had treated the two former cases, the pains and spasms in his body suddenly left him, and in twenty-four hours after I saw him, he complained of nothing but of the pain and swelling in his foot, which continued for several weeks, and did not leave him till it ended in a suppuration. From the history of these three cases, I beg leave to make the following remarks :

1. That the predisposition to the tetanus depends upon a relaxation of the muscular part of the nervous system. This relaxation is generally produced by heat ; but excessive labour, watchings, marches, or fatigue from any cause, all produce it likewise ; and hence we find it more frequent from wounds received in battles, than from similar wounds received in any other way. These wounds more certainly produce the tetanus, if they have been preceded for some time with warm weather. Doctor Shoepft, the physician-general of the Anspach

spach troops who served at the siege of York in the year 1781, informed me of a singular fact upon this subject. Upon conversing with the French surgeons after the capitulation, he was informed by them that the troops who arrived just before the siege from the West Indies with Count de Grasse, were the only troops belonging to their nation who suffered from the tetanus. There was not a single instance of that disorder among the French troops who had spent a winter in Rhode-Island.

2. As the tetanus seems to be occasioned by relaxation, the medicines indicated to cure it are such only as are calculated to remove this relaxation, and to restore tone to the muscular system. The bark, wine, and blisters, appear to act in this way. But I will go one step further. In order to cure this disorder, it is necessary not only to produce an ordinary tone, but a moderate degree of inflammatory diathesis in the arterial system. The absence of this diathesis is taken notice of by all authors, particularly by Doctor Cullen*.

Mercury appears to act only by promoting this diathesis. Hence it never does any service unless

* First Lines, Vol. III.

it be given time enough to produce a salivation. The irritation and inflammation produced in the mouth and throat, seldom fail to produce the inflammatory diathesis, as blood drawn in a salivation has repeatedly shewn.

I apprehend that the oil of amber acts as a stimulant chiefly in this disorder. I have heard of a tetanus being cured in the island of Grenada by large doses of mustard. Doctor Wright, lately of the island of Jamaica, relates in the sixth volume of the London medical essays, several remarkable cases of the tetanus being cured by the cold bath. Both these remedies certainly act as stimulants and tonics. By reasoning *à priori*, I conceive that electricity would be found to be an equally powerful remedy in this disorder.

As a general inflammatory diathesis disposes to topical inflammation, so topical inflammation disposes to general inflammatory diathesis. Wounds upon this account are less apt to inflame in summer than in winter. In the tetanus, I have uniformly observed an absence of all inflammation in the wounds or injuries which produced it. Doctor Stoll of Vienna has made the same observation*.

* Pars tertia, Rationis Medendi, p. 423.

A splinter under the nail produces no convulsions, if pain, inflammation or suppuration follow the accident. It is by exciting pain and inflammation, I apprehend, that the spirit of turpentine acts in all wounds and punctures of nervous and tendinous parts. I have never known a single instance of a tetanus from a wound, where this remedy had been applied in time. It was to excite an inflammation in the foot of Mr. Leslie, that I dilated the wound and filled it with the spirit of turpentine. I was not surpris'd at its good effects in this case, for I was prepared to expect them.

I find a remarkable case related in Doctor W. Monro's Thesis, published in Edinburgh in the year 1783, of a black girl, who had a tetanus from running a nail in her foot, being perfectly cured by deep and extensive incisions made in the wounded part by Doctor John Bell, of the island of Grenada.

It is by producing inflammation in a particular part, and tone in the whole system, I apprehend, that the amputation of a wounded limb sometimes cures a tetanus; and it is because the degrees of both are too inconsiderable to oppose the violence of the spasms in the advanced stages of the tetanus, that amputation often fails of success.

I have

I have been informed by a physician who resided some time at St. Croix, that the negroes on that island always apply a plaster made of equal parts of salt and tallow to their fresh wounds, in order to prevent a locked jaw. The salt always produces some degree of inflammation.

However necessary a certain degree of inflammatory diathesis may be to impart a tone to the muscles, there is sometimes such an *excess*, in this diathesis, as to dispose to spasmodic or convulsive motions. A case of tetanus from this cause was communicated to me in a letter dated April 18th 1792, by my learned and ingenious correspondent Dr. Hopkins of Connecticut, and I have lately met with a case of the same kind in the "Journal de Medecine" for September 1773, by M. Molmy. They both yielded to blood-letting, after the most powerful stimulants had been used to no purpose.

If the facts that have been stated be true, and the inferences that have been drawn from them be just, how shall we account for the action of the opium in curing this disorder? I do not deny its good effects in many cases, but I believe it has failed in four cases out of five in the hands of most practitioners. It is remarkable that it succeeds only where it is given in very large doses. In
these

these cases I would suppose that it acts only as a stimulant. It is upon a footing, therefore, with the stimulating medicines that have been mentioned; but from its being of a more diffusible nature, it is probably inferior to most of them. I am the more inclined to adopt this opinion, from an account I once received from Doctor Robert, of the island of Dominique, who informed me, that after having cured a negro man of a tetanus with large doses of opium, he was afterwards seized with a disorder in his stomach, of which he died in a few days. Upon opening him, he found his stomach inflamed and mortified. I do not forbid the use of opium in this disorder. I think small doses of it may be given to ease pain, as in other spasmodic disorders; but as a radical remedy, I think it ought to yield to stimulants of a more durable nature.

To the cases that have been mentioned, I could add many others, in which I have reason to believe that the excitement of a topical inflammation by artificial means, has effectually prevented a tetanus.

To this account of the tetanus, I beg leave to subjoin a few words upon a disorder commonly called the jaw-fall in infants, or the trismus nascentium

tium of Doctor Cullen, which is nothing but a species of tetanus.

I have met with three cases of it in this city, all of which proved fatal. The stage of the disorder in which I was consulted, and the age and weakness of the infants, forbad me to attempt any thing for their relief. I have introduced the subject of this disorder in children, only for the sake of mentioning a fact communicated to me by the late Doctor Cadwallader Evans of this city. This gentleman practised physic for several years in Jamaica, where he had frequent opportunities of seeing the tetanus in the black children. He found it in every case to be incurable. He supposed it to be connected with the retention of the meconium in the bowels. This led him invariably to purge every child that was born upon the estates committed to his care. After he adopted this practice, he never met with a single instance of the tetanus among children.

Perhaps it may tend to enlarge our ideas of the tetanus, and to promote a spirit of inquiry and experiment, to add, that this disorder is not confined to the human species. I have known several instances of it in horses, from nails running in their feet, and other accidents. It is attended with a
rigidity

rigidity of the muscles of the neck, a stiffness in the limbs, and such a contraction of the jaw as to prevent their eating. It is generally fatal. In two cases I had the the pleasure of seeing the disease perfectly cured by applying a potential caustic to the neck under the mane, by large doses of oil of amber, and by plunging one of them into the river, and throwing buckets of cold water upon the other.

How far the reasonings contained in this paper may apply to the hydrophobia, I cannot determine, having had no opportunity of seeing the disease since I adopted these principles ; but from the spasmodic nature of the disorder, from the season of the year in which it generally occurs, and above all, from the case related by Doctor Fothergill, of a young woman having escaped the effects of the bite of a mad cat by means of the wound being kept open, (which from its severity was probably connected with some degrees of inflammation) is it not probable that the same remedies, which have been used with success in the tetanus, may be used with advantage in the hydrophobia? In a disease so deplorable, and hitherto so unsuccessfully treated even a conjecture may lead to useful experiments and inquiries.



ADDITIONAL OBSERVATIONS

UPON THE

Tetanus and Hydrophobia.

SINCE the publication of the foregoing observations, in the second volume of the American Philosophical Transactions, I have received letters from several physicians in the United States, and in the West Indies*, and one from Doctor James Currie of Liverpool, in Great Britain; in each of which are contained cases that confirm the efficacy of tonic remedies, more especially of *wine* and the *cold bath*, in the cure of tetanus. My own experience has furnished several cases, in addition to those which are published, in favour of the first of those remedies, joined with mercury. I am, notwithstanding, obliged to own, that the method

* Viz. Dr. Conyngham of Virginia, Dr. Shaeff, and Dr. Stocket of Maryland, Dr Campbell of New Jersey, Dr. Betton, and Dr. Broadbelt of Jamaica, and Dr. Alexander Anderson of the Island of St. Vincents.

of cure above-mentioned has failed, in some instances, in the hands of several respectable practitioners in Philadelphia; but I have reason to believe it was only where it was not used in the first stage of the disorder, or where every possible advantage has not been taken of the combined powers of all the tonic remedies that have been mentioned, or where such a regard has not been had to the state of the pulse, as to assist those remedies, by moderate blood-letting.

The Rev. Dr. Henry Muhlenberg, principal of the German college in Lancaster, informed me in the month of June 1787, that he had often met with the trismus nascentium among the children of poor people belonging to his congregation. After reading the account of Doctor Evans's successful method of preventing that disorder in Jamaica, by means of gentle purges, he recommended that practice to the parents of children, where he suspected the disease might take place, and always with success.

The more I have considered the causes and symptoms of hydrophobia, the more I am disposed to ascribe it to the same proximate cause as the tetanus. 1. They both affect the muscles of deglutition. I have lately seen a tetanus brought on by a fractured leg, in which an attempt to swallow the
smallest

smallest quantity of any liquid, produced the same sudden and general convulsions which occur in the hydrophobia. 2. They both proceed from causes which appear to be related to each other, viz. from wounds, and from the action of cold after the body has been previously weakened by heat and exercise. Of the last, we have a remarkable proof in an account of a spontaneous hydrophobia, published by Mr. Arthaud, president of the circle of Philadelphians at Cape Francois, in the first volume of the transactions* of that new and enterprising society. 3. They both sometimes appear as symptoms of the same idiopathic disorder, viz. the hysteria. 4. They both yield to the same remedies, viz. to the excitement of an inflammation in the wounded part of the body, or to a long continued discharge of matter from it, and to mercury. Of the efficacy of each of these remedies, there are proofs, not only in Mr. Arthaud's observations upon the hydrophobia, before mentioned, but in Vanswieten's commentaries upon Boerhaave's aphorisms†.

To these facts I shall add one more, which may serve still further to establish the sameness of the

* Recherches, Memoires, et Observations sur les Maladies Epizootiques, de Saint Domingue, p. 220.

† Aphorism 1143, No. 1.

indications of cure in the tetanus and hydrophobia. In the London medical journal for the months of April, May, and June, 1784, I find the following account published by Doctor De Mathiis, physician to the king of Naples' army. "During his residence in Calabria, (the doctor tells us) that having one day caught a viper in the fields, he had occasion in his way home to pass by a farm-yard, where he saw a dog chained that was said to be mad. He offered water to this dog, upon which he immediately fell into convulsions. Recollecting his viper, he was tempted to try its effects by applying it to the dog's throat. This was accordingly done, and the consequences were, the head of the dog swelled, the symptoms of the hydrophobia ceased, and the animal recovered."

If more facts should occur, which shall shew the relation that the tetanus and hydrophobia have to each other, perhaps we may be led to conclude, that the wound inflicted by the teeth of a dog sometimes acts in the same manner in producing hydrophobia, that wounds made by a nail, or any obtuse lacerating instrument act, in producing tetanus; and that both diseases may be prevented, or cured, with equal certainty by the same tonic remedies.

THE

THE
R E S U L T
O F
O B S E R V A T I O N S

MADE UPON THE DISEASES WHICH OCCURRED

IN THE

Military Hospitals of the United States,
DURING THE LATE WAR.

1. **T**HE army when it lay in tents was always more sickly, than when it lay in the open air. It was likewise more healthy when it was kept in motion, than when it lay in an encampment.

2. Young men under twenty years of age were subject to the greatest number of camp diseases.

3. The fouthern troops were more sickly than the northern or eastern troops.

4. The native Americans were more sickly than the natives of Europe who served in the American army.

5. Men above thirty, and five and thirty years of age, were the hardiest soldiers in the army. Perhaps the reason why the natives of Europe were more healthy than native Americans, was, they were more advanced in life.

6. The southern troops sickened from the want of salt provisions. Their strength and spirits were restored only by means of salted meat. I once saw a private in a Virginia regiment, throw away his ration of choice fresh beef, and give a dollar for a pound of salted bacon.

7. Those officers who wore flannel shirts or waistcoats next to their skins, in general escaped fevers and diseases of all kinds.

8. The principal diseases in the hospitals were the typhus gravior and mitior of Doctor Cullen. Men who came into the hospitals with pleurisies or rheumatisms, soon lost the types of their original diseases, and suffered, or died, by the above-mentioned fever.

9. This fever always prevailed most, and with the worst symptoms in winter. A free air, which could only be obtained in summer, always prevented, or mitigated it.

10. In all those cases, where the contagion was received, cold seldom failed to render it active. Whenever an hospital was removed in winter, one half of the patients generally sickened on the way, or soon after their arrival at the place to which they were sent.

11. Drunken soldiers and convalescents were most subject to this fever.

12. Those patients in this fever who had large ulcers on their back or limbs, generally recovered.

13. I met with several instances of buboes, also of ulcers in the throat, as described by Doctor Donald Monro. They were mistaken by some of the junior surgeons for venereal sores, but they yielded to the common remedies of the hospital fever.

14. There were many instances of patients in this fever, who suddenly fell down dead, upon being moved, without any previous symptoms of approaching dissolution. This was more especially the case, when they arose to go to stool.

15. The contagion of this fever was frequently conveyed from the hospital to the camp, by means of blankets and clothes.

16. Those black foldiers who had been previously slaves, died in a greater proportion by this fever, or had a much slower recovery from it, than the same number of white foldiers.

17. The remedies which appeared to do most service in this disorder were vomits of tartar emetic, gentle doses of laxative salts, bark, wine, volatile salt, opium, and blisters.

18. An emetic seldom failed of checking this fever if exhibited while it was in a *forming* state, and before the patient was confined to his bed.

19. Many causes concurred to produce, and increase this fever; such as the want of cleanliness, excessive fatigue, the ignorance or negligence of officers in providing suitable diet and accommodations for their men, the general use of linen instead of woollen clothes in the summer months, and the crowding too many patients together in one hospital, with such other inconveniences and abuses, as usually follow the union of of the *purveying*

veying and directing departments of hospitals in the same persons. But there is one more cause of this fever which remains to be mentioned, and that is, the sudden assembling of a great number of persons together of different habits and manners, such as the soldiers of the American army were in the year 1776 and 1777. Doctor Blane informs us, in his observations upon the diseases of seamen, “that it sometimes happens that a ship with a long established crew shall be very *healthy*, yet if strangers are introduced among them, who are also *healthy*, sickness will be mutually produced.” The history of diseases furnishes many proofs of the truth of this assertion*. It is very remarkable, that while the American army at Cambridge in the year 1775, consisted only of New-Englandmen (whose habits and manners were the same) there was scarcely any sickness among them. It was not till the troops of the eastern, middle and southern states met at New-York and

* “Cleanliness is founded on a natural aversion to what is unseemly and offensive in the persons of others; and there seems also to be an instinctive horror at strangers implanted in human nature for the same purpose, as is visible in young children, and uncultivated people. In the early ages of Rome, the same word signified both a stranger and an enemy.” Dr. Blane, p. 225.

Ticonderoga

Ticonderoga in the year 1776, that the typhus became universal, and spread with such peculiar mortality in the armies of the United States.

20. The dysentery prevailed in the summer of 1777 in the military hospitals in New-Jersey, but with very few instances of mortality. This dysentery was frequently followed by an obstinate diarrhoea, in which the warm bath was found in many cases to be an effectual remedy.

21. I saw several instances of fevers occasioned by the use of the common ointment made of the flour of sulphur and hogs lard for the cure of the itch. The fevers were probably brought on by the exposure of the body to the cold air, in the usual method in which that ointment is applied. I have since learned, that the itch may be cured as speedily by rubbing the parts affected, two or three times with the dry flour of sulphur, and that no inconvenience and scarcely any smell, follow this mode of using it.

22. In gun-shot wounds of the joints, Mr. Ranby's advice of amputating the limb was followed by success. I saw two cases of death where this advice was neglected.

23. There

23. There was one instance of a soldier who lost his hearing, and another of a soldier who had been deaf who recovered his hearing, by the noise of artillery in a battle.

24. Those soldiers who were billeted in private houses, generally escaped the contagion of the hospital fever, and recovered soonest from all their diseases.

25. Hospitals built of coarse logs, with *ground* floors, with fire-places in the middle of them, and a hole in the roof, for the discharge of smoke, were found to be very conducive to the recovery of the soldiers from the jail fever. This form of a military hospital was introduced into the army by Dr. Tilton of the state of Delaware.

26. In fevers and dysenteries, those soldiers recovered most certainly, and most speedily, who lay at the greatest distance from the walls of the hospitals. This important fact was communicated to me by the late Dr. Beardley of Connecticut.

27. Soldiers are but little more than adult children. That officer, therefore, will best perform his duty to his men, who obliges them to take the most care of their HEALTH.

28. Hospitals

28. Hospitals are the sinks of human life in an army. They robbed the United States of more citizens than the sword. Humanity, œconomy, and philosophy, all concur in giving a preference to the conveniences and wholesome air of private houses; and should war continue to be the absurd and unchristian mode of deciding national disputes, it is to be hoped that the progress of science will so far mitigate one of its greatest calamities, as to produce an abolition of hospitals for acute diseases. Perhaps there are no cases of sickness in which reason and religion do not forbid the seclusion of our fellow-creatures from the offices of humanity in private families, except where they labour under the calamities of madness and the venereal disease, or where they are the subjects of some of the operations of surgery.

A N

A C C O U N T

OF THE

INFLUENCE OF THE MILITARY AND POLITICAL
EVENTS OF THE AMERICAN REVOLUTION

UPON THE

H U M A N B O D Y.

THERE were several circumstances peculiar to the American revolution, which should be mentioned previously to an account of the influence of the events which accompanied it, upon the human body.

1. The revolution interested every inhabitant of the country of both sexes, and of every rank and age that was capable of reflection. An indifferent, or neutral spectator of the controversy, was scarcely to be found in any of the states.

2. The

2. The scenes of war and government which it introduced, were new to the greatest part of the inhabitants of the United States, and operated with all the force of *novelty* upon the human mind.

3. The controversy was conceived to be the most important of any that had ever engaged the attention of mankind. It was generally believed by the friends of the revolution, that the very existence of *freedom* upon our globe, was involved in the issue of the contest in favour of the United States.

4. The American revolution included in it the cares of government, as well as the toils and dangers of war. The American mind was, therefore; frequently occupied at the *same time*, by the difficult and complicated duties of political and military life.

5. The revolution was conducted by men who had been born *free*, and whose sense of the blessings of liberty was of course more exquisite than if they had just emerged from a state of slavery.

6. The greatest part of the soldiers in the armies of the United States had family connections and property in the country.

7. The

7. The war was carried on by the Americans against a nation, to whom they had long been tied by the numerous obligations of consanguinity, laws, religion, commerce, language, interest, and a mutual sense of national glory. The resentments of the Americans of course rose, as is usual in all disputes, in proportion to the number and force of these ancient bonds of affection and union.

8. A predilection to a limited monarchy, as an essential part of a free and safe government, and an attachment to the reigning king of Great-Britain, (with a very few exceptions) were universal in every part of the United States.

9. There was at one time a sudden dissolution of civil government in *all*, and of ecclesiastical establishments in several of the states.

10. The expences of the war were supported by means of a paper currency, which was continually depreciating.

From the action of each of these causes, and frequently from their combination in the same persons, effects might reasonably be expected, both upon the mind and body, which have seldom occurred;

curred ; or if they have, I believe were never fully recorded in any age or country

It might afford some useful instruction, to point out the influence of the military and political events of the revolution upon the understandings, passions, and morals of the citizens of the United States ; but my business in the present inquiry, is only to take notice of the influence of these events upon the human body, through the medium of the mind.

I shall first mention the effects of the military, and secondly, of the political events of the revolution. The last must be considered in a two-fold view, accordingly as they affected the friends or the enemies of the revolution.

I. In treating of the effects of the military events, I shall take notice, first, of the influence of *actual* war, and, secondly, of the influence of the military life.

In the beginning of a battle, I have observed *thirst* to be a very common sensation among both officers and soldiers. It occurred where no exercise, or action of the body, could have excited it.

Many officers have informed me, that after the first onset in a battle, they felt a glow of heat, so universal as to be perceptible in both their ears. This was the case in a particular manner, in the battle of Princeton, on the third of January in the year 1777, on which day the weather was remarkably cold.

A veteran colonel of a New-England regiment, whom I visited at Princeton, and who was wounded in the hand at the battle of Monmouth, on the 28th of June, 1778, (a day in which the mercury stood at 90° of Farenheit's thermometer) after describing his situation at the time he received his wound, concluded his story by remarking, that "fighting was hot work on a cold day, but much more so on a warm day." The many instances which appeared after that memorable battle, of soldiers who were found among the slain without any marks of wounds or violence upon their bodies, were probably occasioned by the heat excited in the body by the emotions of the mind, being added to that of the atmosphere.

Soldiers bore operations of every kind immediately *after* a battle, with much more fortitude than they did at any time afterwards.

The effects of the military life upon the human body come next to be considered under this head.

In another place * I have mentioned three cases of pulmonary consumption being perfectly cured by the diet and hardships of a camp life.

Doctor Blane, in his valuable observations on the diseases incident to seamen, ascribes the extraordinary healthiness of the British fleet in the month of April 1782, to the effects produced on the spirit of the soldiers and seamen, by the victory obtained over the French fleet on the 12th of that month; and relates, upon the authority of Mr. Ives, an instance in the war between Great-Britain and the combined powers of France and Spain in 1744, in which the scurvy, as well as other diseases, were checked by the prospect of a naval engagement.

The American army furnished an instance of the effects of victory upon the human mind, which may serve to establish the inferences from the facts related by Doctor Blane. The Philadelphia militia who joined the remains of General Washington's army, in December 1776, and shared with

* Page 201.

them a few days afterwards in the capture of a large body of Hessians at Trenton, consisted of 1500 men, most of whom had been accustomed to the habits of a city life. These men slept in tents and barns, and sometimes in the open air during the usual colds of December and January; and yet there were only two instances of sickness, and only one of death, in that body of men in the course of nearly six weeks, in those winter months. This extraordinary healthiness of so great a number of men under such trying circumstances, can only be ascribed to the vigour infused into the human body by the victory of Trenton having produced insensibility to all the usual remote causes of diseases.

Militia officers and soldiers, who enjoyed good health during a campaign, were often affected by fevers and other disorders, as soon as they returned to their respective homes. I knew one instance of a militia captain, who was seized with convulsions the first night he lay on a feather bed, after sleeping several months on a mattrass, or upon the ground. These affections of the body appeared to be produced only by the sudden abstraction of that tone in the system which was excited by a sense of danger, and the other invigorating objects of a military life.

The NOSTALGIA of Doctor Cullen, or the *home-sickness*, was a frequent disease in the American army, more especially among the soldiers of the New-England states. But this disease was suspended by the superior action of the mind under the influence of the principles which governed common soldiers in the American army. Of this General Gates furnished me with a remarkable instance in 1776, soon after his return from the command of a large body of regular troops and militia at Ticonderoga. From the effects of the nostalgia, and the feebleness of the discipline, which was exercised over the militia, desertions were very frequent and numerous in his army, in the latter part of the campaign; and yet during the *three weeks* in which the general expected every hour an attack to be made upon him by General Burgoyne, there was not a single desertion from his army, which consisted at that time of 10,000 men.

The patience, firmness, and magnanimity with which the officers and soldiers of the American army endured the complicated evils of hunger, cold, and nakedness, can only be ascribed to an insensibility of body produced by an uncommon tone of mind excited by the love of liberty and their country.

Before

Before I proceed to the second general division of this subject, I shall take notice, that more instances of apoplexies occurred in the city of Philadelphia, in the winter of 1774-5, than had been known in former years. I should have hesitated in recording this fact, had I not found the observation supported by a fact of the same kind, and produced by a nearly similar cause, in the appendix to the practical works of Doctor Baglivi, professor of physic and anatomy at Rome. After a very wet season in the winter of 1694-5, he informs us, that “apoplexies displayed their rage; and “perhaps (adds our author) that some part of “this epidemic illness was owing to the universal “grief and domestic care, occasioned by all Europe “being engaged in a war. All commerce was “disturbed, and all the avenues of peace blocked “up, so that the strongest heart could scarcely bear “the thoughts of it.” The winter of 1774-5, was a period of uncommon anxiety among the citizens of America. Every countenance wore the marks of painful solicitude, for the event of a petition to the throne of Britain, which was to determine whether reconciliation, or a civil war, with all its terrible and distressing consequences, were to take place. The apoplectic fit, which deprived the world of the talents and virtues of Peyton Randolph, while he filled the chair of Con-

gress in 1775, appeared to be occasioned in part by the pressure of the uncertainty of those great events upon his mind. To the name of this illustrious patriot, several others might be added, who were affected by the apoplexy in the same memorable year. At this time a difference of opinion upon the subject of the contest with Great-Britain, had scarcely taken place among the citizens of America.

II. The political events of the revolution produced different effects upon the human body, through the medium of the mind, accordingly as they acted upon the friends or enemies of the revolution.

I shall first describe its effects upon the former class of citizens of the United States.

Many persons of infirm and delicate habits, were restored to perfect health, by the change of place, or occupation, to which the war exposed them. This was the case in a more especial manner with hysterical women, who were much interested in the successful issue of the contest. The same effects of a civil war upon the hysteria, were observed by Doctor Cullen in Scotland, in the years 1745 and 1746. It may perhaps help to
extend

extend our ideas of the influence of the passions upon diseases, to add, that when either love, jealousy, grief, or even devotion, wholly engross the female mind, they seldom fail, in like manner, to cure or to suspend hysterical complaints.

An uncommon cheerfulness prevailed every where, among the friends of the revolution. Defeats, and even the loss of relations and property, were soon forgotten in the great objects of the war.

The population in the United States was more rapid from births during the war, than it had ever been in the same number of years since the settlement of the country.

I am disposed to ascribe this increase of births *chiefly* to the quantity and extensive circulation of money, and to the facility of procuring the means of subsistence during the war, which favoured marriages among the labouring part of the people*. But I have sufficient documents to prove, that marriages were more fruitful than in former

* Wheat which was sold before the war for seven shillings and sixpence, was sold for several years *during* the war for four, and in some places for two and sixpence Pennsylvania currency per bushel. Beggars of every description

years, and that a considerable number of unfruitful marriages became fruitful during the war. In 1783, the year of the peace, there were several children born of parents who had lived many years together without issue.

Mr. Hume informs us, in his History of England, that some old people upon hearing the news of the restoration of Charles the II^d. died suddenly of joy. There was a time when I doubted the truth of this assertion; but I am now disposed to believe it, from having heard of a similar effect from an agreeable political event, in the course of the American revolution. The door-keeper of Congress, an aged man, died suddenly, immediately after hearing of the capture of Lord Cornwallis's army. His death was universally ascribed to a violent emotion of political joy. This species of joy appears to be one of the strongest emotions that can agitate the human mind.

Perhaps the influence of that ardour in trade and speculation, which seized many of the friends of the revolution, and which was excited by the fallacious nominal amount of the paper money,

disappeared in the year 1776, and were seldom seen till near the close of the war.

should

should rather be considered as a disease than as a passion. It unhinged the judgment, deposed the moral faculty, and filled the imagination, in many people, with airy and impracticable schemes of wealth and grandeur. Desultory manners, and a peculiar species of extempore conduct, were among its characteristic symptoms. It produced insensibility to cold, hunger, and danger. The trading towns, and in some instances the extremities of the United States, were frequently visited in a few hours or days by persons affected by this disease; and hence "to travel with the speed of a speculator," became a common saying in many parts of the country. This species of insanity (if I may be allowed to call it by that name) did not require the confinement of a bedlam to cure it, like the South-Sea madness described by Doctor Mead. Its remedies were the depreciation of the paper money, and the events of the peace.

The political events of the revolution produced upon its enemies very different effects from those which have been mentioned.

The hypochondriasis of Doctor Cullen, occurred in many instances in persons of this description. In some of them, the terror and distress of the revolution

volution brought on a true melancholia*. The causes which produced these diseases, may be reduced to four heads. 1. The loss of former power or influence in government. 2. The destruction of the hierarchy of the English church in America. 3. The change in the habits of diet, and company and manners, produced by the annihilation of just debts by means of depreciated paper money. And, 4. The neglect, insults, and oppression, to which the loyalists were exposed, from individuals, and in several instances, from the laws of some of the states.

It was observed in South-Carolina, that several gentlemen who had protected their estates by swearing allegiance to the British government, died soon after the evacuation of Charleston by the British army. Their deaths were ascribed to the neglect with which they were treated by their ancient friends, who had adhered to the government of the United States. The disease was called, by the common people, the *Protection fever*.

From the causes which produced this hypochondriasis, I have taken the liberty of dis-

* Infania partialis sine dyspepsia, of Doctor Cullen.

tinguishing

tinguishing it by the specific name of *Revolutionaria*.

In some cases, this disease was rendered fatal by exile and confinement; and, in others, by those persons who were afflicted with it, seeking relief from spirituous liquors.

The termination of the war by the peace in 1783, did not terminate the American revolution. The minds of the citizens of the United States were wholly unprepared for their new situation. The excess of the passion for liberty, inflamed by the successful issue of the war, produced, in many people, opinions and conduct which could not be removed by reason nor restrained by government. For a while, they threatened to render abortive the goodness of heaven to the United States, in delivering them from the evils of slavery and war. The extensive influence which these opinions had upon the understandings, passions and morals of many of the citizens of the United States, constituted a species of insanity, which I shall take the liberty of distinguishing by the name of *Anarchia*.

I hope no offence will be given by the freedom of any of these remarks. An inquirer after philosophical truth, should consider the passions of men
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in the same light that he does the laws of matter or motion. The friends and enemies of the American revolution must have been more or less than men, if they could have sustained the magnitude and rapidity of the events that characterised it, without discovering some marks of human weakness, both in body and mind. Perhaps these weaknesses were permitted, that human nature might receive fresh honours in America, by the contending parties (whether produced by the controversies about independence or the national government) mutually forgiving each other, and uniting in plans of general order, and happiness.

A N

I N Q U I R Y

I N T O T H E

Relation of Tastes and Aliments

T O E A C H O T H E R ;

A N D I N T O T H E

I N F L U E N C E O F T H I S R E L A T I O N U P O N

Health and Pleasure.

IN entering upon this subject, I feel like the clown, who, after several unsuccessful attempts to play upon a violin, threw it hastily from him, exclaiming at the same time, that “there was music in it,” but that he could not bring it out.

I shall endeavour, by a few brief remarks, to lay a foundation for more successful inquiries upon this difficult subject.

Attraction and repulsion seem to be the active principles of the universe. They pervade not only
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the greatest but the minutest works of nature. Salts, earths, inflammable bodies, metals, and vegetables, have all their respective relations to each other. The order of these relations is so uniform, that it has been ascribed by some philosophers to a latent principle of intelligence pervading each of them.

Colours, odours, and sounds, have likewise their respective relations to each other. They become agreeable and disagreeable, only in proportion to the natural or unnatural combination which takes place between each, of their different species.

It is remarkable, that the number of original colours and notes in music is exactly the same. All the variety in both proceeds from the difference of combination. An arbitrary combination of them is by no means productive of pleasure. The relation which every colour and sound bear to each other, was as immutably established at the creation, as the order of the heavenly bodies, or as the relation of the objects of chemistry to each other.

But this relation is not confined to colours and sounds alone. It probably extends to the objects of human aliment. For example ; bread and meat, meat and salt, the alkalescent meats and acedcent
 vege-

vegetables, all harmonize with each other upon the tongue ; while fish and flesh, butter and raw onions, fish and milk, when combined, are all offensive to a pure and healthy taste.

It would be agreeable to trace the analogy of sounds and tastes. They have both their flats and their sharps. They are both improved by the contrast of discords. Thus pepper, and other condiments, (which are disagreeable when taken by themselves) enhance the relish of many of our aliments, and they are both delightful in proportion as they are simple in their composition. To illustrate this analogy by more examples from music, would lead us from the subject of the present inquiry.

It is observable that the tongue and the stomach, like instinct and reason, are, by nature, in unison with each other. One of those organs must always be disordered, when they disagree in a single article of aliment. When they both unite in articles of diet that were originally disagreeable, it is owing to a perversion in each of them, similar to that which takes place in the human mind, when both the moral faculty and the conscience lose their natural sensibility to virtue and vice.

Unfor-

Unfortunately for this part of science, the taste and the stomach are so much perverted in infancy and childhood by heterogeneous aliment, that it is difficult to tell what kinds and mixtures of food are natural, and what are artificial. It is true, the system possesses a power of accommodating itself both to artificial food, and to the most discordant mixtures of that which is natural; but may we not reasonably suppose, that the system would preserve its natural strength and order much longer, if no such violence had been offered to it?

If the relation of aliments to each other follows the analogy of the objects of chemistry, then their union will be influenced by many external circumstances, such as heat and cold, dilution, concentration, rest, motion, and the addition of substances which promote unnatural, or destroy natural mixtures. This idea enlarges the field of inquiry before us, and leads us still further from facts and certainty upon this subject, but at the same time it does not preclude us from the hope of obtaining both; for every difficulty that arises out of this view of the subject, may be removed by observation and experiment.

I come now to apply these remarks to health and pleasure. I shall select only a few cases for
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this purpose; for if my principles are true, my readers cannot avoid discovering many other illustrations of them.

1. When an article of diet is grateful to the taste, and afterwards disagrees with the stomach, may it not be occasioned by some other kind of food, or by some drink being taken into the stomach, which refuses to unite with the offending article of diet?

2. May not the uneasiness which many persons feel after a moderate meal, arise from its having consisted of articles of aliment which were not related to each other?

3. May not the delicacy of stomach which sometimes occurs after the fortieth or forty-fifth year of human life, be occasioned by nature recovering her empire in the stomach, so as to require simplicity in diet, or such articles only of aliment as are related? May not this be the reason why most people, who have passed those periods of life, are unable to retain or to digest fish and flesh at the same time, and why they generally dine only upon one kind of food?

4. Is not the language of nature in favour of simplicity in diet, discovered by the avidity with

which the luxurious and intemperate often seek relief from variety and satiety, by retreating to spring water for drink, and to bread and milk for aliment?

5. May not the reason why plentiful meals of fish, venison, oysters, beef or mutton, when eaten alone, lie so easily in the stomach, and digest so speedily, be occasioned by no other food being taken with them? A pound, and even more, of the above articles, frequently oppresses the system much less than half the quantity of heterogeneous aliments.

6. Does not the facility with which a due mixture of vegetable and animal food digests in the stomach, indicate the certainty of their relation to each other?

7. May not the peculiar good effects of a diet wholly vegetable, or animal, be occasioned by the more frequent and intimate relation of the articles of the same kingdoms to each other? And may not this be the reason why so few inconveniencies are felt from the mixture of a variety of vegetables in the stomach?

8. May not the numerous acute and chronic diseases of the rich and luxurious, arise from heterogeneous

rogeneous aliments being distributed in a *diffused*, instead of a *mixed* state, through every part of the body?

9. May not the many cures which are ascribed to certain articles of diet, be occasioned more by their being taken alone, than to any medicinal quality inherent in them? a diet of oysters in one instance, of strawberries in another, and of sugar of roses in many instances, has cured violent and dangerous disorders of the breast*. Grapes, according to Doctor Moore, when eaten in large quantities, have produced the same salutary effect. A milk diet, persisted in for several years, has cured the gout. I have seen many cases of dyspepsia cured by a simple diet of beef and mutton, and have heard of a well attested case of a diet of veal alone having removed the same disorder. Squashes, and turnips likewise, when taken by themselves, have cured that distressing complaint in the stomach. It has been removed even by milk, when taken by itself in a moderate quantity†. The farther the body, and more especially the stomach, recede from health, the more this simplicity of diet becomes necessary. The appetite in these

* Vanfweiten, 1209. 3.

† Medical Observations and Inquiries, Vol. VI. p. 310. 319.

cases does not speak the language of uncorrupted nature. It frequently calls for various and improper aliment; but this is the effect of intemperance having produced an early breach between the taste and the stomach.

Perhaps the extraordinary cures of obstinate diseases which are sometimes performed by persons not regularly educated in physic, may be occasioned by a long and steady perseverance in the use of a single article of the materia medica. Those chemical medicines which decompose each other, are not the only substances which defeat, the intention of the prescriber. Galenical medicines, by combination, I believe, frequently produce effects that are of a compound and contrary nature to their original and simple qualities. This remark is capable of extensive application, but I quit it as a digression from the subject of this inquiry.

10. I wish it to be observed, that I have condemned the mixture of different aliments in the stomach only in a few cases, and under certain circumstances. It remains yet to determine by experiments, what changes are produced upon aliments by heat, dilution, addition, concentration, motion, rest, and the addition of uniting substances, before we can decide upon the relation of aliments

to each other, and the influence of that relation upon health. The olla podrida of Spain, is said to be a pleasant and wholesome dish. It is probably rendered so, by a previous tendency of all its ingredients to putrefaction, or by means of heat producing a new arrangement, or additional new relations of all its parts. I suspect heat to be a powerful agent in disposing heterogeneous aliments to unite with each other; and hence the mixture of aliments is probably less unhealthy in France and Spain, than in England, where so much less fire is used in preparing them than in the former countries.

As too great a mixture of glaring colours, which are related to each other, becomes painful to the eye, so too great mixture of related aliments oppresses the stomach, and debilitates the powers of the system. The original colours of the sky, and of the surface of the globe, have ever been found the most permanently agreeable to the eye. In like manner, I am disposed to believe that there are certain simple aliments which correspond, in their sensible qualities, with the intermediate colours of *blue* and *green*, that are most permanently agreeable to the tongue and stomach, and that every deviation from them is a departure from the simplicity of health and nature.

11. While nature seems to have limited us to simplicity in aliment, is not this restriction abundantly compensated by the variety of tastes which she allows us to impart to it in order to diversify and increase the pleasure of eating? It is remarkable that salt, sugar, mustard, horse-radish, capers, and spices of all kinds, according to Mr. Goffe's experiments, related by Abbè Spallanzani*, all contribute not only to render aliments savory, but to promote their digestion.

12. When we consider, that part of the art of cookery consists in rendering the taste of aliments agreeable, is it not probable that the pleasure of eating might be increased beyond our present knowledge upon that subject, by certain new arrangements or mixtures of the substances which are used to impart a pleasant taste to our aliment?

13. Should philosophers ever stoop to this subject, may they not discover and ascertain a table of the relations of sapid bodies to each other, with the same accuracy that they have ascertained the relation of the numerous objects of chemistry to each other?

* *Dissertations*, Vol. I. p. 326.

14. When

14. When the tongue and stomach agree in the same kinds of aliment, may not the increase of the pleasure of eating be accompanied with an increase of health and prolongation of life?

15. Upon the pleasure of eating, I shall add the following remarks. In order to render it truly exquisite, it is necessary that all the senses, except that of taste, should be as *quiescent* as possible. Those persons mistake the nature of the appetite for food, who attempt to whet it by accompanying a dinner by a band of music, or by connecting the dining table with an extensive and delightful prospect. The excitement of one sense, always produces collapse in another. Even conversation sometimes detracts from the pleasure of eating; hence great feeders love to eat in silence, or alone; and hence the speech of a passionate Frenchman, while dining in a talkative company, was not so improper as might be at first imagined. "Hold your tongues, (said he) I cannot taste my dinner." I know a physician, who, upon the same principle, always shuts his eyes, and requests silence in a sick chamber, when he wishes to determine by the pulse the propriety of blood-letting, in cases where its indication is doubtful. His perceptions become more distinct, by confining his whole attention to the sense of feeling.

It is impossible to mention the circumstance of the senses acting only in succession to each other in the enjoyment of pleasure, without being struck by the impartial goodness of Heaven, in placing the rich and the poor so much upon a level in the pleasures of the table. Could the numerous objects of pleasure, which are addressed to the ears and the eyes, have been possessed at the same time, with the pleasure of eating, the rich would have commanded three times as much pleasure in that enjoyment as the poor; but this is so far from being the case, that a king has no advantage over a beggar, in eating the same kind of aliment.

THE

THE

NEW METHOD

OF

INOCULATING

FOR THE

Small Pox.

Delivered in a Lecture in the University of Pennsylvania, on the
20th of February, 1781.

GENTLEMEN,

IT must afford no small pleasure to a benevolent mind in the midst of a war, which daily makes so much havoc with the human species, to reflect, that the small-pox which once proved equally fatal to thousands, has been checked in its career, and in a great degree subdued by the practice of INOCULATION.

It is foreign to my purpose to deliver to you the history of this art, and to mark the various steps that have attended its progress to its present

lent state of improvement. We have yet to lament the want of uniformity and of equal success in the practice of it among physicians. A great number of pamphlets have been written upon the subject without exhausting it. There is still ample room left for the man of genius to exercise his talents for observation and reasoning upon it. The facts I mean to lay before you are so inconsiderable, compared with what still remain to be known upon this subject, that I have to request, when your knowledge in it is completed, that you would bury my name in silence; and forget that ever I ventured to lay a single stone in this part of the fabric of science.

In treating upon this subject, I shall

I. Consider the proper subjects and seasons for inoculation.

II. I shall describe the method of communicating the disorder.

III. I shall consider the method of preparing the body for the small-pox.

IV. I shall mention the treatment proper during the eruptive fever; and,

V. Point

V. Point out a few cautions that are necessary after the disease is over.

I. Formerly there were great difficulties in the choice of the subjects for *Inoculation*. But experience teaches us that it may be practised in every stage of life, and in almost every condition of the human body. In infancy the periods before and after dentition are to be preferred. But we seldom see any great inconveniences from submitting to the general necessity of inoculating children between the ages of three months and two years. Indeed we often see children cut three or four teeth during the preparation and eruptive fever, without the least addition being made to any of the troublesome symptoms which accompany the small-pox. There is one inconvenience attending the choice of the first months of infancy for inoculating, and that is, the matter often fails of producing the disorder in such young subjects. I have frequently failed in two or three attempts to communicate the disorder to children under four months old with the same matter that has succeeded in a dozen other patients inoculated at the same time. When the inoculation succeeds in such tender subjects, they generally have less fever, and fewer pustules, than are common in any future period of life.

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Although a physician would prefer a patient in good health to any other as a subject for inoculation, yet cases often occur in which it is necessary to communicate the small-pox while the body is affected with some other disorder. I can with pleasure inform you, that the small-pox is rendered so perfectly safe by inoculation, that there are few chronic diseases which should be considered as obstacles in the way of it. I have inoculated patients labouring under a tertian fever, obstructed viscera, the whooping cough, the hypochondriasis, the asthma, the itch, and other cutaneous disorders, and even pregnant women, with the same, and in some instances, with greater success than persons in perfect health. Doctor Cullen informs us that he has seen inoculation succeed in scrophulous patients. A physician in Jamaica informed me that he had inoculated Negroes with success in the worst stage of the yaws. To these facts I must add one more extraordinary than any that has been yet mentioned: Doctor Brown, my late colleague in the care of the military hospitals, informed me, that he had seen inoculation succeed in patients who were seized, after the infection was communicated, with the hospital fever. The preparation of the body should be accommodated to the disease which affects it. Some physicians have thought the small-pox, received in this way,

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was a remedy for other diseases, but my experience has not confirmed this opinion. On the contrary, I am disposed to think that no other change is produced by inoculation, than by the regimen and medicines that are used to prepare the body for the small-pox. Nor does the small-pox, during its continuance, afford any security against the attacks of other diseases. I have seen the most alarming complication of the small-pox and measles in the same person.

The seasons commonly preferred for inoculation in this country are, the spring and fall. It may be practised with equal safety in the winter, a due regard being had to the temperature of the air in the preparation of the body.

The principal objection to inoculating in the summer months in this climate, arises from the frequency of bilious disorders at that season, to which the preparation necessary for the small-pox probably disposes the body. This caution applies more directly to children who at a certain age are more subject than grown people to a disorder in their bowels in warm weather.

II. The methods of communicating the small-pox by inoculation, have been different in different countries,

countries, and in the different æras of its progress towards its present stage of improvement. The scab, doffel of lint, and the thread impregnated with variolous matter and bound up in a gash in the arm, have been laid aside.

We are indebted to Mr. Sutton for the mode of communicating it by a slight puncture with the point of a lancet, or needle, dipt in fresh matter. As it is difficult sometimes to procure matter in a fresh state, I have been led to use it with equal success by preserving it on lint in a box, and moistening it with cold water just before I used it. Matter may be kept in this way for a month without losing its infectious quality, provided it be not exposed to heat or moisture. The former destroys its power of infecting as certainly as the salt of tartar destroys the acidity of vinegar. Moisture, by remaining long upon the matter, probably destroys its virulence by subjecting it to fermentation. The longer matter has been kept in a general way, the longer the distance will be between the time of communicating the disorder and the eruptive fever. It will be proper always to yield to the prejudices of our patients in favour of matter taken from persons who have but few pustules. But I am persuaded from repeated observations, that the disease is no ways influenced by this circumstance.

cumstance. I am satisfied likewise that there is no difference between the effects of the matter, whether it be taken in its watery and purulent state. The puncture should not be larger than is sufficient to draw one drop of blood, but it should always be made by a *sharp* lancet, for the sudden inflammation and suppuration, excited by a dull lancet, sometimes throw off the matter so as to prevent its infecting the body *. No plaster or bandage should be applied over the puncture. It should be made in the left arm of all subjects. The objections to inoculating in the leg are too obvious to be mentioned. I have heard of the disease being communicated by rubbing the dry skin with the matter. My own observations upon this subject give me reason to suspect the facts that are contained in books relative to this mode of infecting the body. I have bound large pieces of lint dipt in fresh matter for twenty-four hours upon the arm, without producing the disorder. A practitioner of physic in *New-Jer-*

* I am disposed to believe that the external applications which are used by the Indians for the cure of the bite of poisonous snakes, act only by exciting inflammation and suppuration, which discharge the poison from the wound before it is absorbed. All their external remedies are of a *stimulating* nature.

sey informed me that he once gave a considerable quantity of fresh variolous matter in a dose of physic without infecting his patient. I suspect the matter that produces the disease is of the same nature with certain poisons, which require to be brought in contact with a wound or sore in the body before they produce their effects. I deliver this opinion with diffidence. The subject stands in need of more experiments and investigation

III. I come now to consider the best method of preparing the body for the small-pox. This must be done, 1st by DIET, and 2dly by MEDICINE. The DIET should consist chiefly of vegetables. I have never seen any inconvenience from the free use of milk as a part of the preparative diet. In some habits, where a morbid acid prevails in the stomach, we may indulge our patients in a little weak flesh broth two or three times a week with safety. Tea, coffee, and even weak chocolate, with biscuit or dry toast, may be used as usual, by persons accustomed to that kind of aliment. Wine and spirits of all kinds should be withheld from our patients during the preparation. The more ascescent their drinks are, the better. It is unnecessary that this change in the diet should take place till a day or two before the time of communicating the disorder. The

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system accommodates to a vegetable and low diet in the course of three weeks or a month, so as to defeat in some measure the advantages we expected from it. The good effects of it appear to depend in a great degree upon the *suddenness* with which we oblige our patients to conform to it. For this reason, when we are called upon to inoculate persons who have lived more than three or four weeks upon a low diet, we should always direct them to live a few days upon animal food before we communicate the disorder to them. By these means we may produce all the good effects of the *sudden* change in the diet I have already mentioned. 2. The MEDICINES most commonly used to prepare the body for the small-pox are antimony and mercury. The latter has had the preference, and has been given in large quantities under a notion of its being a specific antidote to the variolous matter. Many objections might be made to this opinion; I shall mention only three.

1. We often see the disorder in a high degree after the system is fully impregnated with mercury.

2. We often see the same salutary effects of mercury when given before the disorder is communicated to the body, that we perceive when it is given after inoculation; in which case we are sure

the mercury cannot enter into the mixture with the variolous matter so as to destroy it.

3. If mercury acted specifically in destroying the variolous matter, it would render every other part of the preparation unnecessary, but this we know is not the case, for the neglect or improper use of the vegetable diet or cool regimen is often attended with an extraordinary number, or virulence of the small-pox, even in those cases where mercury is given in the largest quantity.

The way in which mercury prepares the body for the small-pox, seems to be by promoting the several excretions, particularly that by perspiration, which, by diminishing the quantity of the fluids and weakening the tone of the solids, renders the system less liable to a plentiful eruption of the small-pox. But I object to the use of this medicine for the following reasons:

1. It effectually deprives us of all the benefits of the cool regimen; for mercury we know, always *disposes* the system to take cold.

2. All the good effects of mercury may be produced by PURGES, which do not subject the body to the above-mentioned inconvenience.

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The **PURGES** may be suited to the constitutions, and in some cases, even to the inclinations of our patients. I have seen jalap, rhubarb, fenna, manna, aloes, soluble tartar, glauher and Epsom salts, and the butternut pill, all given with equal success. The quantity should be sufficient to procure three or four stools every day. A little magnesia should always be mixed with rhubarb and jalap in preparing children. It will be sufficient for the mothers and nurses of infants to conform strictly to the vegetable diet. I have never seen any advantages from giving them even a single dose of physic.

It is hardly necessary to observe, that the quality, dose, and number of purges are to be determined by the age, sex, and habits of our patients. A constitution enfeebled with a previous disease forbids the use of purges, and requires medicines of a restorative kind. Patients afflicted with cutaneous disorders bear larger and more frequent doses of physic than are indicated in more healthy subjects.

In adult subjects of a plethoric habit, blood-letting is very useful on the third or fourth day after inoculation. We are not to suppose, that every fat person labours under a plethora. A mo-

derate degree of fat is so far from rendering the disease more violent, especially in children, that I think I have generally found such subjects have the small-pox more favourably than others.

Moderate exercise in the open air should be used during the preparation. But hard labour, and every thing that promotes sweat or fatigue, as also the extremes of heat and cold, should be avoided.

IV. We come now to consider the treatment of the body during the eruptive fever. On the eighth day after inoculation our patients are *generally* seized with the common symptoms of fever. Sometimes this fever appears on the sixth and seventh day after inoculation. But when it is irregular, it is often delayed till the ninth and tenth days. I have seen many instances of it on the fourteenth, a few on the fifteenth and sixteenth, and *one* case in which it did not come on till the eighteenth day after the infection was communicated to the body*. The place where the puncture was made

* Since the publication of the first edition of this lecture, I have heard of two cases, in one of which the fever did not come on till the twentieth, and in the other till the twenty-first day after the infection was communicated to the body. In some of these tedious cases, I have seen an
inflam.

with the lancet, or needle, generally serves as an harbinger of the approaching fever. A slight inflammation appears about it and a pock rises up in the centre. But this remark is liable to some objections. I have seen *four* instances in which the fever came on at the expected time, and the disorder went through all its stages with the greatest regularity, and yet there was no sign of an inflammation or pock near the spot where the puncture was made: even the puncture itself became invisible. On the other hand, we sometimes see an inflammation and pock on the arm appear on the eighth and ninth days without any fever accompanying them. Some physicians pretend that this inflammation and solitary pock are sufficient to constitute the disease; but repeated experience has taught me to be very cautious in relying upon these equivocal marks. It is true, I have sometimes seen patients secured against the small-pox both in the natural way and by inoculation where these marks have appeared; but I have as often seen such patients seized afterwards with the small-pox in the natural way, to the great distress of families and mortification of phy-

inflammation and suppuration on the punctured part of the arm on the eighth day without any fever. Perhaps in these cases the inflammation and suppuration are only cuticular, and that the small-pox is taken from the matter which is formed by them.

ficians. Upon this account I make it a constant practice to advise a second or third inoculation where a fever and eruption have been wanting. As the absence of these symptoms is probably occasioned by the weakness or age of the variolous matter, or the too high state of preparation of the body, we should always guard against both, by making the puncture the second time with *fresh* matter, by subjecting our patients to a *less* abstemious diet, and by giving fewer doses of physic. I have heard it remarked, that if a slight redness and a small pimple appeared on the arm on the third day after inoculation, it was a sign the matter had infected the whole constitution. I acknowledge I have often seen a greater degree of redness on the third than on the second day after inoculation, but I have not been able to establish a diagnostic mark from it; for I have seen the disease produced on the usual days where the redness has appeared on the second day, and in some cases where it has not appeared until the eruptive fever.

I am led here unwillingly to discuss the old question, Is it possible to have the small-pox in the natural way after inoculation?—In many of the cases supposed to be the small-pox from inoculation, it is probable the matter has been taken from the
chicken.

chicken-pox, which resembles the small-pox in many of its peculiarities, but in none more than that of leaving pits or marks on the skin. But there are certainly cases where there are the most irrefragable proofs of the infection implanted by inoculation being of a variolous nature, where the disorder has been afterwards taken in the natural way. In these cases I would suppose the variolous matter produced only a topical or cuticular disorder. We see something analogous to this in nurses who attend patients in the small-pox. But further, this topical or cuticular infection may be produced by art in persons who have had the small-pox in the natural way. Some years ago I made a puncture on my left hand with a lancet moistened with variolous matter. On the eighth day an inflammation appeared on the place, accompanied by an efflorescence in the neighbourhood of it, which extended about two inches in every direction from the spot where the puncture was made. On the eleventh day I was surprised to find two pocks (if I may venture to call them such) the one on the outside of the fourth finger of my left hand, and the other on my forehead. They remained there for several days, but without filling with matter, and then dropped off rather in the form of a soft wart, than of a common scab. Doctor Way, of Wilmington, repeated the same experiment upon himself, but with an issue to his curiosity more extraordinary

traordinary than that I have just now related. On the eighth day after he had made a puncture on his hand, a pock appeared on the spot, which in the usual time filled with matter, from which he inoculated several children, who sickened at the usual time, and went through all the common stages and symptoms of the small-pox. It would seem from these facts, that it is necessary the small-pox should produce some impression upon the *whole* system, in order to render it ever afterwards incapable of receiving an impression of a similar nature. A fever and an eruption therefore seem necessary for this purpose. As the inflammation of the arm on the eighth day is a sign of the *topical* and cuticular infection, so an eruption (though ever so small) seems to be the only certain sign of the infection of the *whole* system. The eruption is the more decisive in its report in proportion as it comes out and goes off in the usual manner of the small-pox in the natural way. In those cases where patients have been secured against a second attack of the disorder, when there have been no *obvious* fever or *visible* eruption, I think I have observed an unusual inflammation, and a copious and long continued discharge of matter from the arm. Perhaps this may serve as an outlet of the matter, which in other cases produces the fever and eruption. I am the more disposed to embrace this opinion from the testimony which several authors have left us
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of the effects of ulcers in securing the body from the infection of the plague. The effects of issues are still more to our purpose. We observe a plentiful discharge of matter from them every time the body is exposed to cold, and the febrile effects of it upon the system are thereby frequently obviated. How far a ratio exists between the degrees of inflammation and the discharge of matter from the arm, and the degrees of fever and eruption, must be determined by future and very accurate observations. If it should appear, that there are the least inflammation and smallest discharge, where there have been the highest fever and most copious eruption; and on the contrary, if it should appear, that there are the greatest inflammation and discharge where there have been the least fever and smallest eruption, I must beg leave to add, without attempting in this place to explain the reasons of it, that the remark, if generally true, is liable to some exceptions. But the subject is involved in darkness; I shall be satisfied if I have brought you within sight of the promised land. Your own ingenuity, like another Jewish leader, must conduct you thither.

The indications in the treatment of the body during the eruptive fever are,

1st. To

1st. To regulate the degree of fever.

2d. To mitigate troublesome and alarming symptoms.

The fever which produces the eruption is generally of the inflammatory kind. It sometimes therefore comes on with the symptoms of great heat, preceded with chilliness, and determination to the head and breast, and a full hard pulse. The remedies proper in this case are,

A. Blood-letting. The quantity to be drawn must be regulated by the violence of the symptoms, the constitution, habits, and even country of the patient, and by the season of the year. I have never found more than one bleeding, to the quantity of twelve or fourteen ounces, necessary in any stage or degree of the eruptive fever of the small-pox by inoculation.

B. Cool air is of the utmost consequence in the eruptive fever. The use of this remedy in fevers marks an æra, not only in the management of the small-pox, but in medicine. The degrees of cold should always be increased in proportion to the violence of the fever. Stove-rooms, so common in this country, should be carefully avoided.

The

The more we oblige our patients to sit up and walk in the open air, the better. Even in those cases where they languish most for the bed, they should be encouraged rather to lie upon, than *under* the bed-clothes. Children should be stript of flannel petticoats that come in contact with their skins; and even clouts should be laid aside if possible, without great inconvenience, and at any rate they should be often removed. Great and obvious as the advantages of cold air appear to be in the eruptive fever, it has sometimes been used to an excess that has done mischief. There are few cases where a degree of cold below forty of *Fahrenheit's* thermometer is necessary in this stage of the small-pox. When it has been used below this, or where patients have been exposed to a damp atmosphere some degrees above it, I have heard of inflammations of an alarming nature being produced in the throat and breast.

c. The bowels, more especially of children, should be kept open with gentle laxatives. And,

d. Cool subacid drinks should be plentifully used until the eruption be completed.

Sometimes the small-pox comes on with a fever the reverse of that which we have described. The
heat

heat is inconsiderable, the pulse is weak, and scarcely quicker than ordinary, and the patient complains of but slight pains in the back and head. Here the treatment should be widely different from that which has been mentioned when the fever is of the inflammatory kind. Bleeding in this case is hurtful, and even cool air must be admitted with caution. The business of the physician in this case is to excite a gentle action in the sanguiferous system, in order to produce the degree of fever which is necessary to the eruption of the pock. For this purpose he may recommend the use of warm drinks, and even of a warm bed with advantage. If the eruption delays beyond the third day, with all the circumstances of debility that have been mentioned, I have frequently ordered my patients to eat a few ounces of animal food, and to drink a glass or two of wine, with the most desirable success. The effects of this indulgence are most obvious where the weakness of the fever and the delay of the eruption in children, have made it necessary to allow it to mothers and nurses.

The small-pox by inoculation so seldom comes on with the symptoms of what is called a putrid fever, that little need be said of the treatment proper in such cases. I shall only observe, that the cold regimen in the highest degree, promises more success

success in these cases than in any others. I have repeatedly been told, that when the small-pox appears confluent among the Africans, it is a common practice for mothers to rub their children all over with pepper, and plunge them immediately afterwards into a spring of cold water. This, they say, destroys a great part of the pock, and disposes the remainder to a kindly suppuration. From the success that has attended the use of the cold bath in putrid fevers in some parts* of Europe, mentioned in a former lecture, I am disposed to believe in the efficacy of the African remedy.

The fever generally lasts three days, and the eruption continues for a similar length of time, counting the last day of the fever as the first day of the eruption. But this remark is liable to many exceptions. We sometimes observe the eruption to begin on the first, and often on the second day of the fever; and we sometimes meet with

* In a dissertation entitled "*Epidemia verna quæ Wratislaviæ, Anno. 1737 afflixit*," published in the appendix to the *Acta Nat. Curios*, Vol. X. it appears, that washing the body all over with cold water in putrid fevers, attended with great debility, was attended with success at *Breslaw* in *Silesia*. The practice has since been adopted, we are told, by several of the neighbouring countries. CULLEN'S FIRST LINES OF THE PRACTICE OF PHYSIC.

cases in which a second eruption comes on after the fever has abated for several days, and the first eruption considerably advanced in its progress towards a complete suppuration. This is often occasioned by the application of excessive cold or heat to the body, or by a sudden and premature use of stimulating drinks or animal food.

I come now to treat of the best method of mitigating troublesome and alarming symptoms.

The only *alarming* symptom is convulsions, to which children are subject during the time of dentition. These have been less frequent, since the liberal and judicious use of cool air in the eruptive fever than formerly. They are often relieved by putting the feet in warm water. But a more effectual and speedy method of curing them, is to expose our patients suddenly to the open air. The colder the air the quicker relief it affords in these cases. To prevent the return of the fits, as well as to allay any disagreeable and troublesome startings, a few drops of laudanum should be given. They generally yield in a little while to this excellent remedy.

The next symptom which demands the aid of our art, is the inflammation and sore on the arm.

Poul-

Poultices of all kinds should be laid aside, as tending to increase the inflammation and sore. Instead of these, the part affected should be washed three or four times a day with cold water*. This application is not only agreeable to our patients, but soon checks the progress of the inflammation, and disposes the sore to heal about the time the eruption is completed. The eyes should likewise be washed frequently with cold water, to secure them from pustules and inflammation. With respect to those alarming or troublesome symptoms which occur in those cases where the pocks are numerous, or confluent, they happen so seldom in inoculation, that they do not come properly under our notice in this place. They are moreover fully discussed by Doctors Boerhaave, Huxham, Hillary, and other practical writers.

V. I come now, in the last place, to deliver a few directions that are necessary after the eruption and suppuration are over.

It is well known that eruptions of an obstinate nature sometimes follow the small-pox. These I

* Where the inflammation on the arm has been so considerable as not to yield immediately to the application of cold water, I have used the vegeto-mineral water with advantage.

believe are often occasioned by a too *sudden* and speedy use of animal food. To guard against these disagreeable consequences of inoculation, it is of the utmost importance to enjoin a cautious and *gradual* return to the free use of an animal diet; and at the same time it will be necessary to give our patients a dose or two of purging physic.

Thus, gentlemen, have I delivered to you a short history of the new method of inoculating for the small-pox. I am aware that prejudices are entertained against some parts of it by physicians of the most ancient name and character among us. I have witnessed the effects of the old and new methods of preparing the body upon many thousand patients, and I am satisfied not only from my own observations, but from the experience of gentlemen upon whose judgments I rely more than upon my own, that the new method is by far the safest and most successful. Added to this, I can assure my pupils, that I have never known a single instance of a patient, prepared and treated in the manner I have described, that ever had an abscess after the small-pox, or even such an inflammation or sore upon the arm as required the application of a poultice.

A P P E N D I X,

CONTAINING

O B S E R V A T I O N S

ON THE

Duties of a Physician,

AND THE

METHODS OF IMPROVING

M E D I C I N E.

ACCOMMODATED TO THE PRESENT STATE OF SOCIETY
AND MANNERS IN THE UNITED STATES.

DELIVERED IN THE UNIVERSITY OF PENNSYLVANIA,
FEBRUARY 7, 1789, AT THE CONCLUSION OF A COURSE OF
LECTURES UPON CHEMISTRY AND THE
PRACTICE OF PHYSIC.

PUBLISHED AT THE REQUEST OF THE CLASS.



A P P E N D I X.

GENTLEMEN,

I SHALL conclude our course of lectures, by delivering to you a few directions for the regulation of your future conduct and studies, in the line of your profession.

I shall, *first*, suggest the most probable means of establishing yourselves in business, and of becoming acceptable to your patients, and respectable in life.

Secondly. I shall mention a few thoughts which have occurred to me on the mode to be pursued, in the further prosecution of your studies, and for the improvement of medicine.

I. Permit me, in the first place, to recommend to such of you as intend to settle in the country, to establish yourselves as early as possible upon *farms*. My reasons for this advice are as follow :

1. It will reconcile the country people to the liberality and dignity of your profession, by shewing them that you assume no superiority over them from your education, and that you intend to share with them in those toils, which were imposed upon man in consequence of the loss of his innocence. This will prevent envy, and render you acceptable to your patients as men, as well as physicians.

2. By living on a farm you may serve your country by promoting improvements in agriculture. Chemistry (which is now an important branch of a medical education) and agriculture are closely allied to each other. Hence some of the most useful books upon agriculture have been written by physicians. Witness the essays of Dr. Home of Edinburgh, and of Dr. Hunter of Yorkshire in England.

3. The business of a farm will furnish you with employment in the healthy seasons of the year, and thereby deliver you from the *tædium vitæ*, or what is worse, from retreating to low or improper company. Perhaps one cause of the prevalence of dram or grog drinking, with which country practitioners are sometimes charged, is owing to their having no regular or profitable business to employ them in the intervals of their attendance upon their patients.

4. The

4. The resources of a farm will create such an independence as will enable you to practice with more dignity, and at the same time screen you from the trouble of performing unnecessary services to your patients. It will change the nature of the obligation between you and them. While *money* is the only means of your subsistence, your patients will feel that they are the channels of your daily bread; but while your farm furnishes you with the necessaries of life, your patients will feel more sensibly, that the obligation is on their side, for health and life.

5. The exigencies and wants of a farm in *stock* and *labour* of all kinds, will enable you to obtain from your patients a compensation for your services in those articles. They all possess them, and men part with that of which money is only the sign, much more readily than they do with money itself.

6. The resources of a farm will prevent your cherishing, for a moment, an impious wish for the prevalence of sickness in your neighbourhood. A healthy season will enable you to add to the produce of your farm, while the rewards of an unhealthy season will enable you to repair the inconvenience of your necessary absence from it. By

these means your pursuits will be marked by that *variety* and *integrity*, in which true happiness is said to consist.

7. Let your farms be small, and let your *principal* attention be directed to grass and horticulture. These afford most amusement, require only moderate labour, and will interfere least with your duties to your profession.

II. Avoid singularities of every kind in your manners, dress, and general conduct. Sir Isaac Newton, it is said, could not be distinguished in company, by any peculiarity, from a common well-bred gentleman. Singularity in any thing, is a substitute for such great or useful qualities as command respect; and hence we find it chiefly in little minds. The profane and indelicate combination of extravagant ideas, improperly called wit, and the formal and pompous manner, whether accompanied by a wig, a cane, or a ring, should be all avoided, as incompatible with the simplicity of science and the real dignity of physic. There is more than one way of playing the quack. It is not necessary, for this purpose, that a man should advertise his skill, or his cures, or that he should mount a phaeton and display his dexterity in operating, to an ignorant and gaping multitude. A
physician

physician acts the same part in a different way, who assumes the character of a madman or a brute in his manners, or who conceals his fallibility by an affected gravity and taciturnity in his intercourse with his patients. Both characters, like the quack, impose upon the public. It is true, they deceive different ranks of people; but, we must remember that there are two kinds of vulgar, viz. the rich and the poor; and that the rich vulgar are often below the poor, in ignorance and credulity.

III. It has been objected to our profession, that many eminent physicians have been unfriendly to christianity. If this be true, I cannot help ascribing it in part to that neglect of public worship with which the duties of our profession are often incompatible; for it has been justly observed, that the neglect of this religious and social duty, generally produces a relaxation, either in principles or morals. Let this fact lead you, in setting out in business, to acquire such habits of punctuality in visiting your patients, as shall not interfere with acts of public homage to the Supreme Being. Dr. Gregory has observed, that a cold heart is the most frequent cause of deism. Where this occurs in a physician, it affords a presumption that he is deficient in humanity. But I cannot admit that infidelity is peculiar to our profession. On the

contrary, I believe christianity places among its friends more men of extensive abilities and learning in medicine, than in any other secular employment. Stahl, Hoffman, Boerhaave, Sydenham, Haller and Fothergill were all christians. These enlightened physicians were considered as the ornaments of the ages in which they lived, and posterity has justly ranked them among the greatest benefactors of mankind.

IV. Permit me to recommend to you a regard to all the interests of your country. The education of a physician gives him a peculiar insight in the principles of many useful arts, and the practice of physic favours his opportunities of doing good, by diffusing knowledge of all kinds. It was in Rome, when medicine was practised only by slaves, that physicians were condemned by their profession "*mutam exercere artem.*" But in modern times, and in free governments, they should disdain an ignoble silence upon public subjects. The American revolution has rescued physic from its former slavish rank in society. For the honour of our profession it should be recorded, that some of the most intelligent and useful characters, both in the cabinet and the field during the late war, have been physicians. The illustrious Dr. Fothergill opposed faction and tyranny, and took the
lead

lead in all public improvements in his native country, without suffering thereby the least diminution of that reputation, or business, in which, for forty years, he flourished almost without a rival in the city of London.

V. Let me advise you, in your visits to the sick, *never* to appear in a hurry, nor to talk of indifferent matters before you have made the necessary inquiries into the symptoms of your patient's disease.

VI. Avoid making light of any case. "*Respice finem*" should be the motto of every indisposition. There is scarcely a disorder so trifling, that has not directly, or indirectly, proved an outlet to human life. This consideration should make you anxious and punctual in your attendance upon every acute disease, and keep you from risking your reputation by an improper or hasty prognosis.

VII. Do not condemn, or oppose, unnecessarily, the simple prescriptions of your patients. Yield to them in matters of little consequence, but maintain an inflexible authority over them in matters that are essential to life.

VIII. Pre-

VIII. Preserve, upon all occasions, a composed or cheerful countenance in the room of your patients, and inspire as much hope of a recovery as you can, consistent with truth, especially in acute diseases. The extent of the influence of the will over the human body, has not yet been fully ascertained. I reject the futile pretensions of Mr. Mesmer to the cure of diseases, by what he has absurdly called animal magnetism. But I am willing to derive the same advantages from his deceptions, which the chemists have derived from the delusions of the alchemists. The facts which he has established, clearly prove the influence of the imagination, and will, upon diseases. Let us avail ourselves of the handle which those powers of the mind present to us, in the strife between life and death. I have frequently prescribed remedies of doubtful efficacy in the critical stage of acute diseases, but never till I had worked up my patients into a confidence, bordering upon certainty, of their probable good effects. The success of this measure has much oftener answered, than disappointed my expectations; and while my patients have commended the vomit, the purge or the blister which was prescribed, I have been disposed to attribute their recovery to the vigorous concurrence of the *will* in the action of the medicine. Does the will beget insensibility to cold, heat, hunger,

ger,

ger, and danger? Does it suspend pain, and raise the body above feeling the pangs of Indian tortures? Let us not then be surpris'd that it should enable the system to resolve a spasm, to open an obstruction, or to discharge an offending humour. I have only time to hint at this subject. Perhaps it would lead us, if we could trace it fully, to some very important discoveries in the cure of diseases.

IX. Permit me to advise you in your intercourse with your patients, to attend to that principle in the human mind, which constitutes the association of ideas. A chamber, a chair, a curtain, or even a cup, all belong to the means of life or death, accordingly as they are associated with cheerful or distressing ideas, in the mind of a patient. But this principle is of more immediate application in those chronic diseases which affect the mind. Nothing can be accomplished here, till we produce a new association of ideas. For this purpose a change of place and company are absolutely necessary. But we must sometimes proceed much further. I have heard of a gentleman in South-Carolina who cured his fits of low spirits by changing his clothes. The remedy was a rational one. It produced at once a new train of ideas, and thus removed the paroxysm of his disease.

X. Make

X. Make it a rule never to be angry at any thing a sick man says or does to you. Sickness often adds to the natural irritability of the temper. We are, therefore, to bear the reproaches of our patients with meekness and silence. It is folly to resent injuries at any time, but it is cowardice to resent an injury from a sick man; since, from his weakness and dependence upon us, he is unable to contend with us upon equal terms. You will find it difficult to attach your patients to you by the obligations of friendship or gratitude. You will sometimes have the mortification of being deserted by those patients who owe most to your skill and humanity. This led Dr. Turner to advise physicians never to chuse their friends from among their patients. But this advice can never be followed by a heart that has been taught to love true excellency, wherever it finds it. I would rather advise you to give the benevolent feelings of your hearts full scope, and to forget the unkind returns they will often meet with, by giving to human nature—— a tear.——

XI. Avoid giving a patient over in an acute disease. It is impossible to tell in such cases where life ends, and where death begins. Hundreds of patients have recovered, who have been pronounced

nounced incurable, to the great disgrace of our profession. I know that the practice of predicting danger and death upon every occasion, is sometimes made use of by physicians, in order to enhance the credit of their prescriptions if their patients recover, and to secure a retreat from blame, if they should die. But this mode of acting is mean and illiberal. It is not necessary that we should decide with confidence at any time, upon the issue of a disease.

XII. A physician in sickness is always a welcome visitor in a family ; hence he is often solicited to partake of the usual sign of hospitality in this country, by taking a draught of some strong liquor, every time he enters into the house of a patient. Let me charge you to lay an early restraint upon yourselves, by refusing to yield to this practice, especially in the *forenoon*. Many physicians have been innocently led by it into habits of drunkenness. You will be in the more danger of falling into this vice, from the great fatigue and inclemency of the weather to which you will be exposed in country practice. But you have been taught that strong drink affords only a temporary relief from those evils, and that it afterwards renders the body more sensible of them.

XIII.

XIII. I shall now give some directions with respect to the method of charging for your services to your patients.

When we consider the expence of a medical education, and the sacrifices a physician is obliged to make of ease, society, and even health, to his profession; and when we add to these, the constant and painful anxiety which is connected with the important charge of the lives of our fellow-creatures, and above all, the inestimable value of that blessing which is the object of his services, I hardly know how it is possible for a patient sufficiently and justly to reward his physician. But when we consider, on the other hand, that sickness deprives men of the means of acquiring money; that it increases all the expences of living; and that high charges often drive patients from regular-bred physicians to quacks; I say, when we attend to these considerations, we should make our charges as moderate as possible, and conform them to the following state of things.

Avoid measuring your services to your patients by scruples, drachms, and ounces. It is an illiberal mode of charging. On the contrary, let the number and *time* of your visits, the nature of your patient's disease, and his rank in his family or society,

ciety, determine the figures in your accounts. It is certainly just to charge more for curing an apoplexy, than an intermitting fever. It is equally just, to demand more for risking your life by visiting a patient in a contagious fever, than for curing a pleurisy. You have a right likewise to be paid for your anxiety. Charge the same services, therefore, higher to the master or mistress of a family, or to an only son or daughter, who call forth all your feelings and industry, than to less important members of a family and of society. If a rich man demands more frequent visits than are necessary, and if he imposes the restraints of keeping to hours by calling in other physicians to consult with you upon every trifling occasion, it will be just to make him pay accordingly for it. As this mode of charging is strictly agreeable to reason and equity, it seldom fails of according with the reason and sense of equity of our patients. Accounts made out upon these principles, are seldom complained of by them. I shall only remark further upon this subject, that the sooner you send in your accounts after your patients recover, the better. It is the duty of a physician to inform his patient of the amount of his obligation to him at least *once* a year. But there are times when a departure from this rule may be necessary. An unexpected misfortune in business, and a variety of other accidents,

dents, may deprive a patient of the money he had allotted to pay his physician. In this case, delicacy and humanity require, that he should not know the amount of his debt to his physician, till time had bettered his circumstances.

I shall only add, under this head, that the poor of every description should be the objects of your peculiar care. Dr. Boerhaave used to say, "they were his best patients, because God was their paymaster." The first physicians that I have known, have found the poor the steps by which they have ascended to business and reputation. Diseases among the lower class of people are generally simple, and exhibit to a physician the best cases of all epidemics, which cannot fail of adding to his ability of curing the complicated diseases of the rich and intemperate. There is an inseparable connection between a man's duty and his interest. Whenever you are called, therefore, to visit a poor patient, imagine you hear the voice of the good Samaritan sounding in your ears, "Take care of him and I will repay thee."

I come now to the second part of this address, which was to point out the best mode to be pursued, in the further prosecution of your studies, and the improvement of medicine.

I. Give me leave to recommend to you, to open all the dead bodies you can, without doing violence to the feelings of your patients, or the prejudices of the common people. Preserve a register of the weather, and of its influence upon the vegetable productions of the year. Above all, record the epidemics of every season; their times of appearing and disappearing, and the connection of the weather with each of them. Such records, if published, will be useful to foreigners, and a treasure to posterity. Preserve, likewise, an account of chronic cases. Record the name, age and occupation of your patient; describe his disease accurately, and the changes produced in it by your remedies; mention the doses of every medicine you administer to him. It is impossible to tell how much improvement and facility in practice you will find from following these directions. It has been remarked, that physicians seldom remember more than the two or three last years of their practice. The records which have been mentioned, will supply this deficiency of memory, especially in that advanced stage of life when the advice of physicians is supposed to be most valuable.

II. Permit me to recommend to you further, the study of the anatomy (if I may be allowed the expression) of the human mind, commonly called

metaphysics. The reciprocal influence of the body and mind upon each other, can only be ascertained by an accurate knowledge of the faculties of the mind, and of their various modes of combination and action. It is the duty of physicians to assert their prerogative, and to rescue the mental science from the usurpations of schoolmen and divines. It can only be perfected by the aid and discoveries of medicine. The authors I would recommend to you upon metaphysics, are, Butler, Locke, Hartley, Reid, and Beattie. These ingenious writers have cleared this sublime science of its technical rubbish, and rendered it both intelligible and useful.

III. Let me remind you, that improvement in medicine is not to be derived only from colleges and universities. Systems of physic are the productions of men of genius and learning ; but those facts which constitute real knowledge, are to be met with in every walk of life. Remember how many of our most useful remedies have been discovered by quacks. Do not be afraid, therefore, of conversing with them, and of profiting by their ignorance and temerity in the practice of physic. Medicine has its Pharisees, as well as religion. But the spirit of this sect is as unfriendly to the advancement of medicine, as it is to christian charity.

city. By conversing with quacks, we may convey instruction to them, and thereby lessen the mischief they might otherwise do to society. But further.—In the pursuit of medical knowledge, let me advise you to converse with nurses and old women. They will often suggest facts in the history and cure of diseases which have escaped the most sagacious observers of nature. Even Negroes and Indians have sometimes stumbled upon discoveries in medicine. Be not ashamed to inquire into them. There is yet one more means of information in medicine which should not be neglected, and that is, to converse with persons who have recovered from indispositions without the aid of physicians. Examine the strength and exertions of nature in these cases, and mark the plain and home-made remedy to which they ascribe their recovery. I have found this to be a fruitful source of instruction, and have been led to conclude, that if every man in a city, or a district, could be called upon to relate to persons appointed to receive and publish his narrative, an exact account of the effects of those remedies which accident or whim has suggested to him, it would furnish a very useful book in medicine. To preserve the facts thus obtained, let me advise you to record them in a book to be kept for that purpose. There is one

more advantage that will probably attend the inquiries that have been mentioned; you may discover diseases, or symptoms of diseases, or even laws of the animal economy, which have no place in our systems of nosology, or in our theories of physic.

IV. Study simplicity in the preparation of your medicines. My reasons for this advice are as follow :

1. Active medicines produce the most certain effects in a simple state.

2. Medicines when mixed frequently destroy the efficacy of each other. I do not include chemical medicines alone in this remark. It applies likewise to Galenical medicines. I do not say, that all these medicines are impaired by mixture, but we can only determine when they are not, by actual experiments and observations.

3. When medicines of the same class, or even of different classes, are given together, the *strongest* only produces an effect. But what are we to say to a compound of two medicines which give exactly the same impression to the system? Probably,
if

if we are to judge from analogy, the effect of them will be such as would have been produced by neither, in a simple state.

4. By observing simplicity in your prescriptions, you will always have the command of a greater number of medicines of the *same* class, which may be used in succession to each other, in proportion as habit renders the system insensible of their action.

5. By using medicines in a simple state you will obtain an exact knowledge of their virtues and doses, and thereby be able to decide upon the numerous and contradictory accounts which exist in our books, of the character of the *same* medicines.

Under this head, I cannot help adding two more directions.

1. Avoid sacrificing too much to the *taste* of your patients in the preparation of your medicines. The nature of a medicine may be wholly changed by being mixed with sweet substances. The author of nature seems to have had a design, in rendering medicines unpalatable. Had they been more agreeable to the taste, they would probably
have

have yielded long ago to the unbounded appetite of man, and by becoming articles of diet, or condiments, have lost their efficacy in diseases.

2. Give as few medicines as possible in tinctures made with distilled spirits. Perhaps there are few cases in which it is safe to exhibit medicines prepared in spirits, in any other form than in *drops*. Many people have been innocently seduced into a love of strong drink, from taking large or frequent doses of bitters infused in spirits. Let not our profession be reproached in a single instance, with adding to the calamities that have been entailed upon mankind by this dreadful species of intemperance.

V. Let me recommend to your particular attention, the indigenous medicines of our country. Cultivate or prepare as many of them as possible, and endeavour to enlarge the materia medica, by exploring the untrodden fields and forests of the United States. The ipecacuanha, the Seneka and Virginia snake-roots, the Carolina pink-root, the spice-wood, the saffrafras, the butter-nut, the thoroughwort, the poke, and the stramonium are but a small part of the medicinal productions of America. I have no doubt but there are many hundred other plants which now exhale invaluable medicinal

medicinal virtues in the desert air. Examine, likewise, the mineral waters, which are so various in their impregnation, and so common in all parts of our country. Let not the properties of the insects of America escape your investigation. We have already discovered among some of them, a fly equal in its blistering qualities to the famous fly of Spain. Who knows but it may be reserved for America to furnish the world, from her productions, with cures for some of those diseases which now elude the power of medicine? Who knows but that, at the foot of the Allegany mountain there blooms a flower that is an infallible cure for the epilepsy? Perhaps on the Monongahela, or the Potowmac, there may grow a root that shall supply by its tonic powers, the invigorating effects of the savage or military life in the cure of consumptions. Human misery of every kind is evidently on the decline. Happiness, like truth, is an unit. While the world, from the progress of intellectual, moral and political truth, is becoming a more safe and agreeable abode for man, the votaries of medicine should not be idle. All the doors and windows of the temple of nature have been thrown open by the convulsions of the late American revolution. This is the time, therefore, to press upon her altars. We have already drawn from them discoveries in morals, philosophy, and govern-

government; all of which have human happiness for their object. Let us preserve the unity of truth and happiness, by drawing from the same source, in the present critical moment, a knowledge of antidotes to those diseases which are supposed to be incurable.

I have now, Gentlemen, only to thank you for the attention with which you have honoured the course of lectures which has been delivered to you, and to assure you, that I shall be happy in rendering you all the services that lie in my power, in any way you are pleased to command me. Accept of my best wishes for your happiness, and may the blessings of hundreds and thousands that were ready to perish, be your portion in life, your comfort in death, and your reward in the world to come.

THE END.

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